Betamax

VIDEOCASSETTE RECORDER

SL-5600

VOL.1

SPECIFICATIONS

General

Video recording system:	Rotary two-head helical scanning
Video signal:	EIA standard, NTSC color
Storage temperature:	–20°C to +60°C (–4°F to +140°F)
Operating temperature:	5°C to 40°C (41°F to 104°F)
Antenna:	75-ohm external antenna terminal for VHF 300-ohm external antenna terminals for UHF
Channel coverage:	VHF channels 2 –13 UHF channels 14 –83
VHF output signal:	Channel 3 or 4 (selectable) 75 ohms, unbalanced
Timer:	only for recording Electronic digital timer 12-hour-clock cycle synchronized with the power frequency
Power requirements:	120V ac ± 10%, 60 Hz ± 0.5%
AC OUTLET:	Unswitched max. 400W
Power consumption:	55W
Weight:	16.5kg (36 lb 6 oz)
Dimensions:	495 x 162 x 377 mm (w/h/d) ($19\frac{1}{2}$ x $6\frac{1}{2}$ x $14\frac{7}{8}$ inches)

Video

Input:	VIDEO IN: phono-type connector 1.0V(p-p), 75 ohms, unbalanced, sync negative
Output:	VIDEO OUT: phono-type connector 1.0V(p-p), 75 ohms, unbalanced, sync negative
Signal-to-noise ratio:	Better than 45dB

Audio

Input:	AUDIO IN: mini jack 100k ohms, –10dB MIC: mini jack –60dB, suitable for microphone with 600-ohm impedance
Output:	AUDIO OUT: mini jack Less than 10k ohms, –5dB (100k ohm load), unbalanced
Frequency response:	β II : 50 – 10,000 Hz β III : 50 – 7,000 Hz
Signal-to-noise ratio:	Better than 40dB

Tape transport

Tape speed:	β II : 2.0cm/sec., β III : 1.33cm/sec.
Maximum recording time:	180 min. in β II mode, 270 min. in β III mode (with Sony L-750 cassette)
Fast forward time:	Within $3\frac{1}{2}$ min. (L-500)
Rewind time:	Within $3\frac{1}{2}$ min. (L-500)

Accessories supplied

Betamax videocassette tape
External antenna connector EAC-24 (75-ohm to 300-ohm matching transformer)
External antenna connector EAC-25 (300-ohm to 75-ohm matching transformer)
75-ohm coaxial cable with F-type connectors (2m)
300-ohm ribbon-type lead in (2m)
βetaScan control
Channel number segments

Optional accessories

Extension cable RFC-8
Betamax video cassette tape L-250, L-500, L-750

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND ⚠ MARK ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

SONY®

SERVICE MANUAL

INDEX

1. GENERAL

1-1. General 1-1
1-2. Brief Circuit Description 1-1
1-3. Connections 1-4
1-3-1. Antenna Connection 1-6
1-3-2. TV Connection 1-6
1-3-3. Connections to a Cable TV (CATV) System . . 1-6
1-4. Operation 1-7
1-4-1. Pause 1-7
1-4-2. Rewind,Fast Forward and Betascan Operation 1-7
1-4-3. Fast Play 1-7
1-4-4. Search Switch 1-8
1-4-5. Videocassette Safety Tab 1-8
1-4-6. Tracking Adjustment 1-8
1-4-7. Playback of Tapes Recorded in BETA I Format 1-8
1-4-8. Timer Operation 1-9
1-5. Disassembly 1-12
1-5-1. Cabinet Removal 1-12
1-5-2. Tuner-I.F. Block Removal 1-13
1-5-3. Timer Block Removal 1-13
1-5-4. Check of YC-4 and SA-5 Boards 1-13
1-5-5. Check of PS-9 Board 1-13
1-6. Location of Parts and Controls 1-14

2. BLOCK DIAGRAMS

Overall (1) 2-1
Overall (2) 2-3
Video System 2-5
Servo System (1) 2-7
Servo System (2) 2-9
Betascan (CUE & REVIEW) Drum Speed Control 2-11
Tape Speed Detector 2-12
Auto Program Search 2-12
Drum Servo Timing Chart 2-13
Capstan Servo Timing Chart: FAST PLAY (X3) 2-14
Capstan Servo Timing Chart (βI) 2-14
Capstan Servo Timing Chart (βII) 2-15
Capstan Servo Timing Chart (βIII) 2-16
Tape Speed Automatic Switching Timing Chart (1) . . . 2-17
Tape Speed Automatic Switching Timing Chart (2) . . . 2-18
System Control 2-19
System Control Timing Chart 2-21
Audio 2-23
Audio Level Diagram 2-23
Timer 2-24
Timer Timing Chart 2-25
Tuner-I.F. 2-27
SA-5 Board Switch for REC/PB 2-27

3. PRINTED WIRING BOARD AND SCHEMATIC DIAGRAMS

Tuner Schematic Diagram 3-1
Frame Schematic Diagram 3-2
YC-4, CR-6 and RP-1 Boards 3-5
SA-5, ID-2 and FG-1 Boards 3-13
SY-13/SY-12, RC-5, LA-1/LA-3, CN-3, CN-4 and SW-3 Boards 3-21
IF-11, TU-9, TB-1, TS-6 and TS-7 3-29
PS-9, TR-1/TR-2/TR-4, LF-9 and DT-15/DT-16/DT-17/DT-18/DT-19 Boards 3-37

4. EXPLODED VIEWS

Cabinet Assembly 4-1
Cassette Lift Assembly 4-2
Function Assembly 4-3
Tuner Chassis 4-4
Power Unit Chassis 4-5
Drum Assembly 4-6
Chassis Assembly (1) 4-7
Chassis Assembly (2) 4-8
Chassis Assembly (3) 4-9
Chassis Assembly (4) 4-10
Chassis Assembly (5) 4-11
Chassis Assembly (6) 4-12
Lower Frame Assembly 4-13
Packing 4-14
Commander Block Assembly 4-15

5. ELECTRICAL PARTS LIST

SECTION 1
GENERAL

1-1. GENERAL

Video Cassette Recorder SL-5600 can make a five hour recording (when the L-830 tape is used) and features a convenient Betascan function. This function is especially effective in the playback of the five hour recording.

Main Features include:

- FIVE HOUR RECORD AND PLAYBACK
  The SL-5600, in combination with the L-830 tape using the BETA III mode can produce a continuous recording that is five hours long, (Recording manual time selection (BETA III or BETA II) is provided and the playback tape speed is switched automatically.)
- SOFT PIANO TOUCH FUNCTION BUTTON
  The FUNCTION buttons can be operated with light pressure, because of the use of solenoids.
- REMOTE CONTROL
  This video recorder has a REMOTE socket for the Betascan Control unit. The PAUSE, the Betascan (FWD/REV) and FAST PLAY functions can be controlled remotely as well as at the SL-5600.
- SELECTABLE PLAYBACK SPEED
  The following playback speeds can be selected.

[Betascan (FORWARD/REVERSE)]

The played back tape can be fast-forwarded and rewound with visible high-speed pictures, at an average seven times with BETA II and ten times with BETA III of the normal speed when the FF or REWIND button is depressed in the PLAY mode, and a desired picture can be found rapidly and easily.

[STILL PICTURE PLAYBACK]

When the PAUSE button is depressed during PLAY mode, a still picture will appear on the TV screen.

[FAST PLAY]

When the FAST PLAY button is pressed during playback, playback speed will be three times normal speed. The noise band may appear on the fast-play picture. In such a case, turn the TRACKING control until the best picture is obtained.

- TWO WEEK FOUR PROGRAMMING TIMER
  The video recorder operation can be programmed within a two week set-up period with the incorporated timer to record at a later time four selected time segments of program.
- INCORPORATED RF MODULATOR
  The incorporated RF modulator enables the video recorder to present its playback picture on a common domestic TV receiver. Either channel 3 or 4 can be selected for the playback picture with the RF channel selector switch.
- AUDIO DUB FUNCTION
  Sound can be dubbed onto the recorded tape during playback.
- ANTENNA AUTOMATIC SWITCHING FUNCTION
  The PICTURE SOURCE switch is connected to the TAPE position automatically when the PLAY mode is set up and reset to the TV position also automatically, when the power to the SL-5600 is turned off.
- TELEVISED PROGRAM WATCHABLE WITH VTR CONNECTED
  A televised program from the antenna can be watched on the television receiver while the connected VTR is operated in any modes except the PLAY mode.
- PAUSE AUTOMATIC RELEASE FUNCTION
  This function releases the PAUSE mode for tape protection about five minutes after the mode is set up, if the PAUSE button is not released manually before this time.
- SIMPLE RECORDING OPERATION FOR HIGH PICTURE QUALITY
  The input signal automatic adjusting circuits for the video and audio record signals, the color and B/W automatic switching circuit, and other various circuits enable a non-professional person to make recordings with high picture quality.
- SOFTLY PUSH TYPE ELECTRONIC VARACTOR TUNER
  The channel select buttons can be pushed softly, because of use electronic tuner.

1-2. BRIEF CIRCUIT DESCRIPTION

The major circuit boards of the SL-5600 and their functions are listed below.

PS-9 board:	DC regulated power supply circuit
SY-12, 13 boards:	System control circuit
SA-5 board:	Audio signal record/playback process Servo circuit
YC-4 board:	Y signal & chroma signal record/playback processing circuits Servo reference signal generating circuit High speed ACC circuit
RP-1 board:	Down-converted chroma signal and Y-FM signal record/playback circuits
IF-11 board:	VIF, SIF and AFC circuits
TS-6, 7 boards:	ET (=Electronic Tuning) varactor tuner control circuit
CR-6 board:	Betascan (FORWARD and REVERSE) circuit
DT-15 DT-19 boards:	Program timer circuits
ID-2 board:	Automatic program search circuit, CTL amp circuit

Numerous highly integrated circuits and modules are utilized in the electronic circuit of the SL-5600. The heavy use of integrated circuits and modules makes possible the reduction in the required number of discrete components. Furthermore, overall performance characteristics are made more uniform from unit to unit and general performance quality is improved. Total power consumption is also reduced.

The circuits of the system control and the timer employ microcomputers to control the complicated functions of these sections of the video recorder.

The ICs used and their functions in the verious circuits are listed in the table below.

SY-12, 13 boards

BX342	Auto stop circuit (Tape end detector)
μPD546C	System control circuit
TC4013 BP	Antenna switching & FAST PLAY circuit
TC4001 BP	Pause control

SA-5 board

CX143A	Capstan servo circuit
CX186	Drum servo circuit
TC4011 BP	Switch
TC4027	1/3 counter

YC-4 board

BX358	Hard clamp (H shift correction) circuit
CX130	Electronic switch
CX135	Noise canceller (II)
CX187A	Y processing circuit
CX188A	Color processing circuit
CX196A	Color sync circuit
M58478P	Servo reference counter
BX364	VIRS slicer

RP-1 board

CX134A	RF playback amplifier, RF switcher, Dropout compensator

IF-11 board

CX095C	SIF (SOUND I.F.)
CX177B	VIF (VIDEO I.F.), DETECTOR, AGC
M5135P	AFT

DT-17 board

TC4081	CHANNEL PROGRAM SW
TC4001	EVENT OFF

DT-16 board

MB8841-180	TIMER CONTROL
μPA56C	BUFFER

DT-18 board

μPA54H	MATRIX

TS-7 board

μPC1363C	CHANNEL PROGRAM
μPD4029C	COUNTER
TC4011B	GATE

Video circuitry

The video signal system consists of the circuitry on the YC-4 board, the RP-1 board and the CR-6 board.

The circuitry on the RP-1 board includes the record amplifier to supply the down-converted chroma signal and the Y-FM signal to the video heads during recording, the head amplifiers, to amplify the signals played back from the video heads, and the CX134A, I.C. In the playback mode, in CX134A (IC5001), the amplified signal is separated into the low chrominance signal and the Y-FM signal, and the separated signals are supplied to the YC-4 board.

The YC-4 board, major board of the video system, includes the input and output connectors and the selector switch. The circuitry on the YC-4 board consists of the luminance signal circuit (CX135, IC6 & CX187, IC1), the chroma system circuit (CX188 & CX196), the 4.27 MHz generating circuit, and the servo reference signal generating circuit (M58478P).

In the record mode, the input video signal enters the AGC amplifier in CX187 passes through additional circuitry and becomes the E-E output. At the same time, any color in the signal goes through a comb filter. One comb filter output is through Q36 and Q37 the chroma component is eliminated and the remaining luminance signal is coupled back to CX187 (IC1). This Y signal is subsequently supplied to the clamp circuit. When the signal is B/W, it is supplied directly to the clamp circuit without going through the comb filter circuitry.

The Y signal passed through the clamp circuit is returned to CX187, where it is FM-modulated, via the non-linear emphasis circuit. The luminance FM signal is shifted by 1/2 fH for the corss talk offset.

The chroma signal passed through the ACC amplifier is supplied to the converter in CX188 where it is down-converted to be the 688 kHz chroma signal and supplied to the RP-1 board, as is the Y-FM signal.

In the playback mode, the Y-FM signal from the RP-1 board enters CX187 (IC1) and CX135 (IC6). The signal goes to the FM demodulator, the low pass filter, the noise canceller (II) and the de-emphasis circuit. The output from the de-emphasis circuit goes through the AGC amplifer and the noise canceller (I) in the CX187 and is added to the 3.58 MHz chroma signal from the chroma processing circuit CX188 (IC2) to become the composite output video signal.

The BETA II and BETA III modes are switched by the signal from the SA-5 board. The tape speed is switched by the RECORD TIME switch in the record mode and it is switched automatically in the playback mode. The high speed ACC circuit operates in the playback mode with PAUSE and BETASCAN, other than the standard speed playback, so as to insert a wider vertical sync signal on the CR-6 board as the output video signal is developed.

Signal processing circuit

The signal processing circuit is arranged on the CR-6 board. The rotating video heads trace several video tracks recorded on the tape, while the heads cross the tracks, in the various playbacks other than the ordinary one. In the BETA II mode, the H's of the record patterns are not arranged uniformly and a 0.5H deviation is produced whenever the rotary video heads trace the video track. This signal processing circuit corrects the 0.5H deviation.

The circuit AM-modulates the video signal with the 10.24 MHz carrier wave, delays the modulated signal by 0.5H, and demodulates the signal. Thus the 0.5H delayed video signal is produced. The jumping signal (to show the noise position) switches the 0.5H delayed and the non-delayed video signals in order to produce the video signal without the H deviation. These circuit operations are not performed in the BETA III mode because of the uniform H arrangement in this mode.

The signal processing circuit inserts the false vertical sync signal produced from the RF switch pulse so that the vertical sync of the playback picture on the TV is not disturbed when a noise appears around the vertical sync signal.

System control circuitry

The system control circuitry consists of the circuits on the SY-12 and the SY-13 boards. The SY-12 board circuits are the ON-OFF control circuits for the capstan motor and the drum motor, the solenoid control circuit, the pause control circuit, the tape end sensor circuit, the remote control circuit, and the protection circuit for tape slackness. The SY-13 board circuitry includes the control circuit of the ANT select switch for switching the VHF output of the video cassette recorder and the televised signal, and the control circuit of the camera pause and FAST PLAY.

Servo circuitry

1. **Drum servo circuit**
The drum servo circuit is located on the SA-5 board and the drive circuit on the SY-12 board.The drum is driven directly by the drum motor.
The drum rotation is kept at a constant speed in the record mode by the PG signal (30 Hz) obtained from the PG coil. The phase of the PG signal is compared with that of the vertical sync signal (VD) separated from the video input signal in order to maintain a constant rotational phase of the drum. The VD signal is counted down to 1/2 and the counted-down VD signal is recorded as the CTL signal.

2. **Capstan servo circuit**
The capstan servo circuit is located on the SA-5 board and the drive circuit on the SY-12 board. The functions of the capstan servo circuit are: ① to stabilize the tape speed, ② to switch the two tape speeds are required, and ③ to servo as the tracking servo in the playback mode. The capstan is driven by a DC motor. The speed servo signal developed by the capstan FG is applied to the DC motor. In the record mode, the signal phase of the FG attached to the capstan flywheel is compared with that of the vertical sync signal separated form the video input signal and the phase servo is applied to the DC motor in order to keep the capstan rotation at a constant speed.
In the playback mode, the phase of the CTL signal reproduced from the tape is compared with that of the 59.94 Hz reference signal obtained by the count-down of the 3.58 MHz (X'tal) on the YC-4 board. The servo system functions as the tracking servo to insure that the rotating video heads exactly re-trace the magnetic pattern recorded on the tape.

3. **Tape speed automatic switching circuit**
The tape speed automatic switching circuit is on the SA-5 board. In the record mode, the tape speed is switched with the RECORD TIME manual switch. In the playback mode, the tape speed automatic switching circuit detects that the intervals of the CTL signal recorded on the tape are different in the BETA II and the BETA III modes, and feeds the BETA II or BETA III signal to the capstan servo and the audio circuits, the tape speed being switched automatically.

4. **Blanking signal generating circuit**
The blanking signal generating circuit is located on the SA-5 board. This circuit blanks the video signal in the ordinary playback mode when a signal is not recorded on the tape but the blanking is released in the betascan or the pause mode. In the latter case, the audio is muted.

5. **Fast play circuit**
The triple speed playback circuit is arranged on the SA-5 board. This circuit actuates the speed servo so that the capstan motor rotates at the triple speed of the β II or the β III speed and actuates the phase servo so that the noise bands remain at the top and bottom of the picture in the manner that the phase of the 1/3 signal of the CTL signal (90 Hz in this case) is compared with that of the internal reference signal.

Audio circuitry

The audio circuitry located on the SA-5 board is monaural and includes the microphone amplifier, the playback equalizer amplifier, the line amplifier, the record equalizer amplifier, the AGC and the bias oscillator circuits. Also on the SA-5 board is circuitry that permits the audio dubbing.

Tuner-I.F. block

The tuner-I.F. block includes the tuner (BT-852), the preset channel select section, the tuner AGC, the antenna select switch, the RF modulator, timer power-backup battery circuit and the antenna terminal board.

1. **Tuner**
The tuner is a UHF/VHF monolithic construction ET varactor tuner, selecting channels electronically.

2. **Preset channel select section**
The preset channel select section is located on the TS-6, 7 boards and arranged with the band select switch for V-LOW (2ch to 6ch), V-HIGH (7ch to 13ch) and UHF (14ch to 83ch), and the preset volume.
The channel select switch feeds out the command to switch the preset tuned voltage and the channel indication light.
The channel hold is done in IC1 on the TS-7 board because of the non-lock channel select switch. The four event channel designation in the TIMER RECORD mode is executed between the microcomputer and the counter on the TS-7 board.

3. **IF section**
The IF section is located on the IF-11 board and includes the VIF, SIF and AFC circuits.

4. **Tuner AGC circuit**
The tuner AGC circuit is located on both the TU-9 and the IF-11 boards. The IF signal level is detected in the VIF circuit and converted to a voltage for the I.F. and tuner gain control.

5. **DC converter circuit**
The DC converter produces 33V (for developing the tuning voltage) for the tuner, −12V (the VHF band switching voltage) and +110V (the indicator voltage) from 12V.

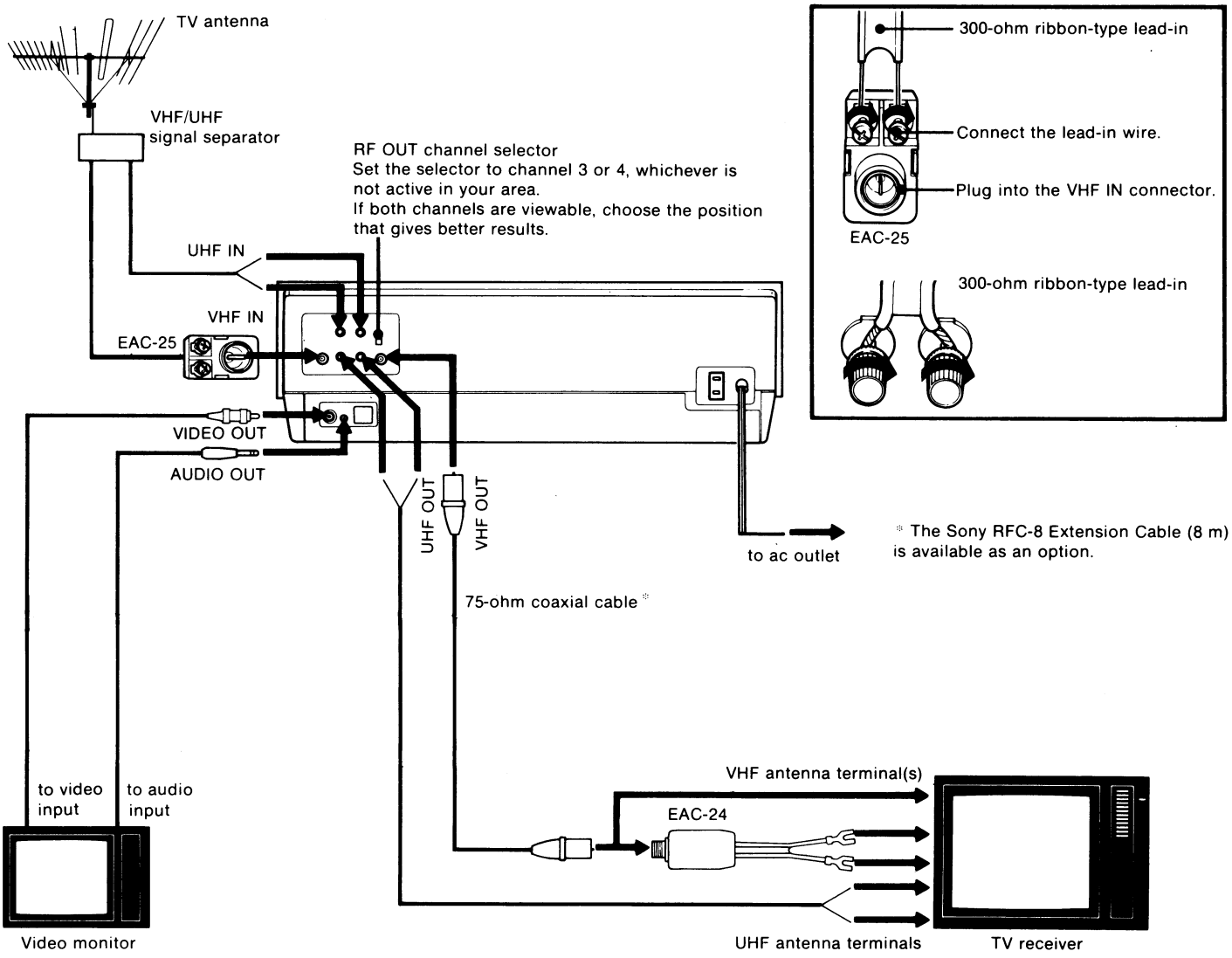
6. **Timer power backup battery circuit**
When a power interruption is occurred, this circuit supplies DC5V to keep the timer micro computer memory. This circuit consists of the battery that is 1.5V dc and charging time is 30 hours and converter circuit.

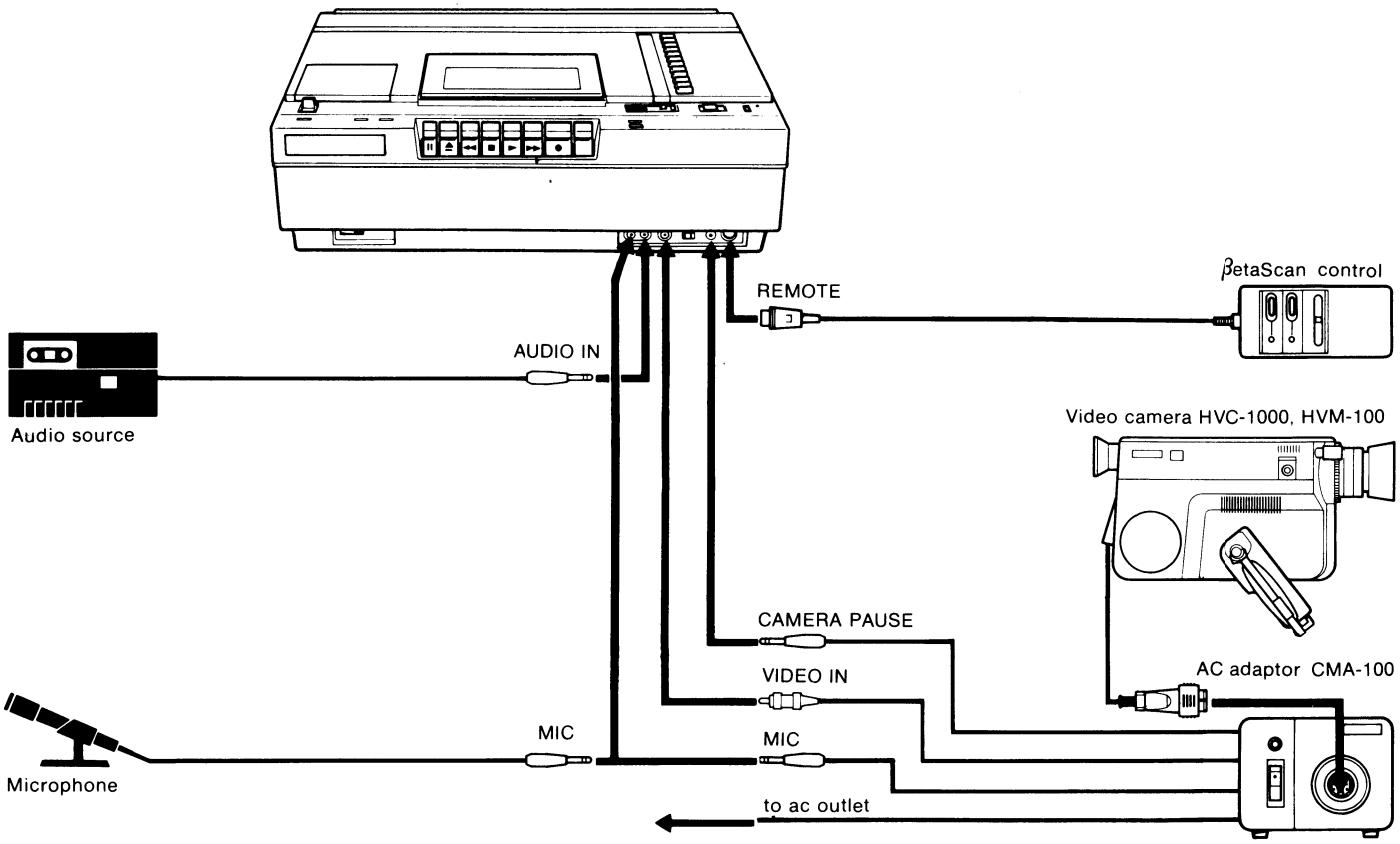
Timer circuitry

The timer circuitry is located on the DT-15 ~19 boards. This timer is gang to tuner circuit and memorizes a single time segment for up to two weeks in advance as four programs to be recorded in the designated future time, and recorded daily until shut off or tape runs out.

1-3. CONNECTIONS

CONNECTION DIAGRAMS





Notes:

- Cameras must conform to American TV (EIA) standards.
- The MIC jack has priority over the AUDIO IN jack. Any input to the AUDIO IN jack is automatically disconnected whenever a microphone is inserted into the MIC jack.
- In camera recording, set the CAMERA TUNER Selector to CAMERA, and connect a microphone to the MIC jack, or connect a tape recorder or a record player to the AUDIO IN jack.
- Before making a TV recording, check that the CAMERA/TUNER Selector is set to TUNER and the cable from the MIC jack is disconnected.

1-3-1. Antenna Connection

VHF and UHF antennas with separate lead-in wires, or a combination VHF-UHF antenna with a single lead-in wire may be used. When a combination VHF-UHF antenna is in use, the signals, separated by a VHF-UHF signal separator, are fed to the VHF and UHF IN terminals of the video recorder respectively.

- Connection to VHF antenna terminal
  When using a 75-ohm coaxial cable lead-in from the antenna, connect it to the VHF antenna connector [VHF IN] with an F-type connector (optional).
  When using a 300-ohm ribbon-type lead-in, connect the leads to the EAC-25 External Antenna Connector (supplied), then connect the Antenna Connector to the VHF IN connector.
- Connection to UHF antenna terminals
  Connect a 300-ohm ribbon-type lead-in wire to the UHF antenna terminals [UHF IN].

1-3-2. TV Connection

Connect the VHF OUT connector on the recorder to the VHF antenna terminal on the TV with the 75-ohm coaxial cable supplied. The signal from the VHF OUT connector is selected by the PROGRAM SELECT switch. When the switch is set to TV, the VHF TV signal connected to the VHF IN connector is supplied from the VHF OUT connector. When the switch is set to VTR (the associated lamp lights), the VHF or UHF TV signal selected by the built-in tuner is supplied at the VHF OUT connector; the playback signal of the recorded tape is also supplied from this connector in the VTR position.

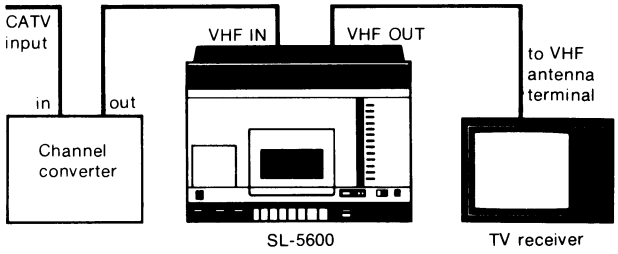
For UHF TV signal connection, connect the UHF OUT terminals of the recorder to the UHF antenna terminals of the TV with the 300-ohm ribbon-type lead-in supplied. The UHF TV signal connected to the UHF IN terminals are supplied from these terminals. The PROGRAM SELECT switch has no effect upon UHF viewing.

Caution

Connection between the SL-5600 VHF OUT connector and the antenna terminals of a TV receiver should be made only as shown in these instructions. Failure to do so may result in operation that violates the regulations of the Federal Communications Commission regarding the use and operation of rf devices. Never connect the output of the SL-5600 to an antenna or make simultaneous (parallel) antenna and SL-5600 connections at the antenna terminals of your receiver.

1-3-3. Connections to a Cable TV (CATV) System

- It is recommended that you consult with your cable television company for proper connection of your Betamax unit to your cable TV system.
- Before operating the recorder with a cable-TV system, set the RF UNIT channel selector on the recorder to channel 3 or 4, whichever is not active in your area. If both channels are viewable, check which gives better results by switching between channes 3 and 4.

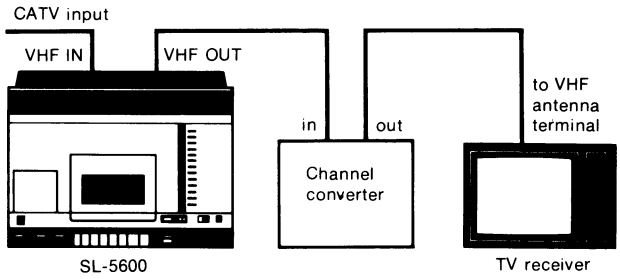


In the above configuration, you can record programs from all CATV channels as well as VHF channels 2 through 13.

Set the TV channel selector to that of the RF UNIT channel selector.

Set the channel select button on the recorder to receive the output channel of converter. Set the PROGRAM SELECT switch on the recorder to the VTR position.

Thus, the channel to be viewed or to be recorded is selected on the converter.



In this configuration, you can veiw one program from the converter while recording a program on VHF channels 2 through 13 via the recorder. Set the TV channel selector to the output channel of the converter and the PROGRAM SELECT switch to TV.

For playback, set the channel selector on the converter to that of the RF UNIT channel selector.

When a channel converter is not in use, connect the CATV input to the recorder, then connect the recorder and the TV receiver as show in connection diagram.

1-4. OPERATION

1-4-1. Pause

To stop the tape momentarily during record, playback or audio dub mode, press the PAUSE button. The PAUSE/FREEZE lamp will light. The pause function is electrically controlled, thus the PAUSE button is not locked in the depressed position. To restart the tape, push the PAUSE button again.

When the PAUSE button is pressed during recording, the E-to-E (electronics-to-electronics) mode picture–the picture selected by the recorder for recording, will be observed on the TV screen, but not recorded.

When the PAUSE button is pressed during playback, a freeze frame picture will appear on the TV screen. A "snowy" band may appear in the freeze frame picture.

The pause mode may be remotely controlled with the Betascan control unit.

- After more than about 5 minutes in the pause mode of operation, the pause mode will be automatically released, and the previous mode (record or playback) will be restored.
- Recordings made with the use of the PAUSE button may exhibit momentary instability in playback at the point the pause mode was initiated.

1-4-2. Rewind, Fast Forward and Betascan Operation

Press the REWIND or FF button for rewind or fast forward operation. During rewind or fast forward mode, the E-to-E mode picture will appear on the TV screen.

When the tape has reached the end of the rewind or fast forward operation, it will stop automatically and the respective function button will be released. The tape may be stopped at any point during rewind or fast forward by pressing the STOP button.

When the REWIND or FF button is pressed during playback, the recorder starts Betascan operation, and a forward or reverse picture with high-speed motion will be observed on the TV screen. During Betascan operation, streaks may appear in the playback picture. The Betascan operation may be remotely controlled with the Betascan control unit.

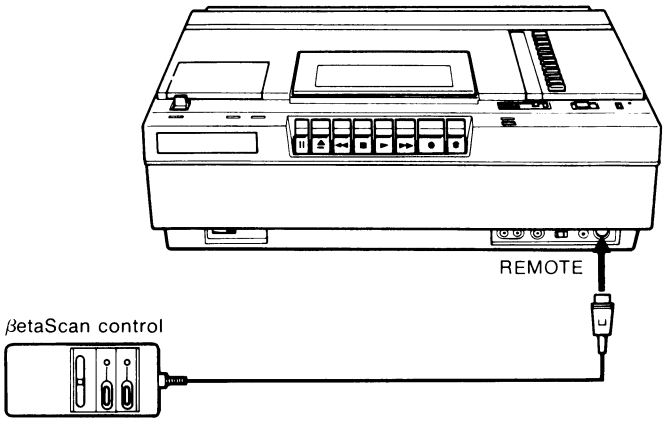
Remote Control

The pause, Betascan and fast play features may be remotely controlled with the Betascan control unit.

Align and insert the plug into the REMOTE connector on the recorder.

The PAUSE button on the control functions the same as that on the recorder. During the pause mode of operation, the associated lamp will light. The Betascan button will function when the recorder is in the playback mode. Press the REVIEW side, and a high-speed reverse picture will be observed. Press the CUE side and a high-speed forward picture will be observed.

The FAST PLAY button on the control will function during playback. Press the FAST PLAY button, and playback speed will be three times normal speed. Press the FAST PLAY button again to restore the normal speed.

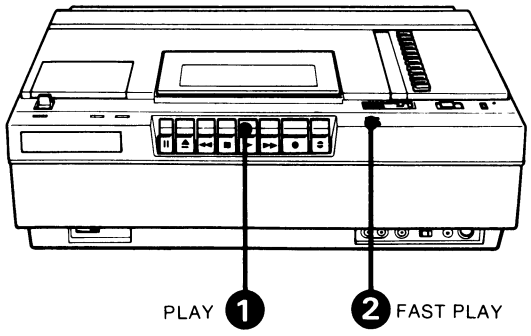


1-4-3. Fast Play

When the FAST PLAY button is pressed during playback, playback speed will be three times normal speed. The associated lamp will light. To restore the normal playback speed, press the FAST PLAY button again. The noise band may appear on the fast-play picture.

In such a case, turn the TRACKING control until the best picture is obtained.

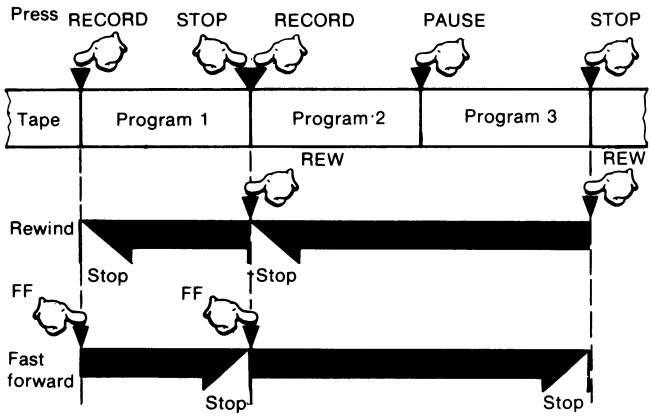
The fast play operation may be remotely controlled with the Betascan control unit supplied.



1-4-4. Search Switch

For precise relocation of a program on a recorded tape, the SEARCH switch may be used.

Each time the REC button is pressed, acue signal is recorded on the tape. Set the SEARCH switch to INDEX and press the FF or REW button. The tape will stop where the nearest cue signal is located and depressed button will be automatically released. If another program on the tape must be relocated beyond the position where the



- This mechanism functions when the tape recorded on an SL5600 is used.
- To detect the cue signal, it is necessary to run the tape for a certain length (as same as running the tape for about 3 minutes at normal speed).
- When timer recording, the cue signal will be recorded at every starting point even though the REC button is not depressed each time.

When this switch is set to MEMORY COUNTER, the tape stops where the tape counter reading was set to "0000".

① Locate any desired starting point on the tape and reset the tape counter to "0000" at this point.

② Set the SEARCH switch to MEMORY COUNTER.

③ Play or record the tape.

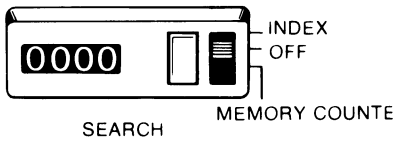
④ Press the STOP button.

⑤ Press the REW button.

The tape will rewind and stop, releasing the REW button automatically at a point near the tape counter reading "9999" (one count before "0000" in order to avoid missing the starting point).

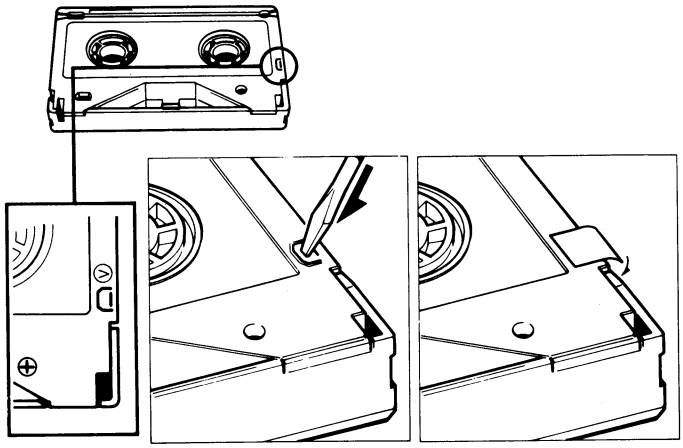
- To rewind the tape further than "0000", press the REW button again.

When either of the above-mentioned functions is not required, set the switch to OFF.



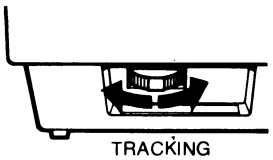
1-4-5. Videocassette Safety Tab

To protect a recording from accidental erasure, break off the tab on the bottom of the videocassette using a screwdriver or similar device. With the tab removed, the RECORD button cannot be pressed. If you wish to record on a cassette with the tab removed, simply cover the hole with a piece of cellophane or vinyl tape.



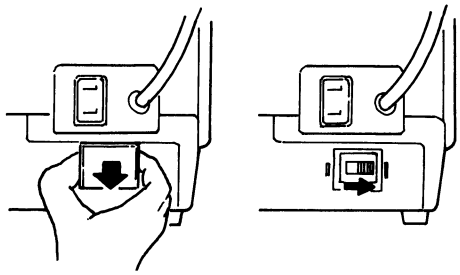
1-4-6. Tracking Adjustment

In the unlikely event that streaks or snow appear in the playback of tapes made on other recorders or in the fast-play picture, turn the TRACKING control in either direction until the best picture is obtained. Allow a second or two for new settings to take effect. When playback of this particular tape is finished, return the TRACKING control to its center detent position.



1-4-7. Playback of Tapes Recorded in BETA I Format

Playback of the tapes recorded in the BETA I format is possible with this recorder. To playback this type of tape, set the tape speed switch on the rear panel to the β I position. To expose the switch, remove the plastic cover.

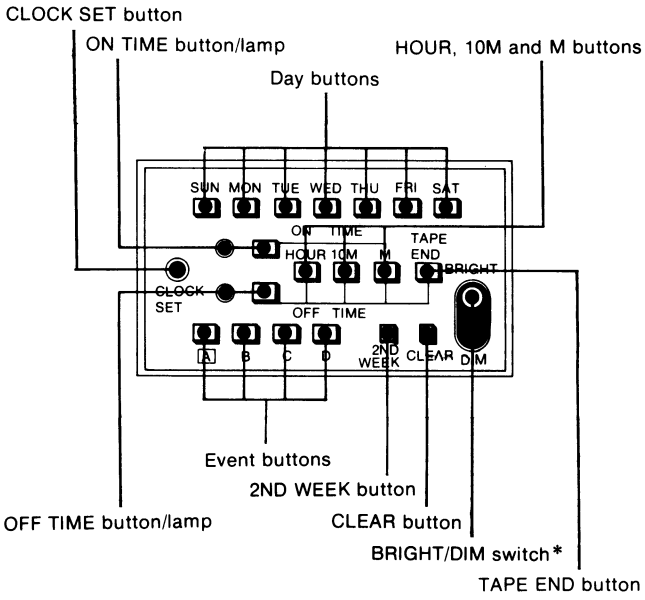


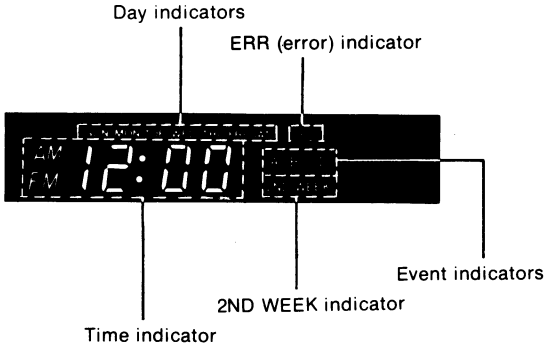
During playback of a tape recorded in the BETA I format, the Betascan operation and fast play does not function and a freeze frame picture cannot be obtained in the pause mode.

- Reset the switch to its original position (β II/β III) when playback of this particular tape is finished.

1-4-8. Timer Operation

The built-in timer functions as a normal clock showing the time in the indicator window. Using the timer as described, a recording may be made while the recorder is unattended.



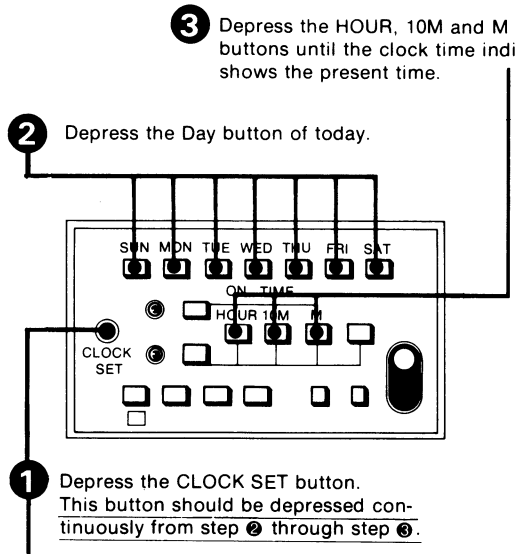


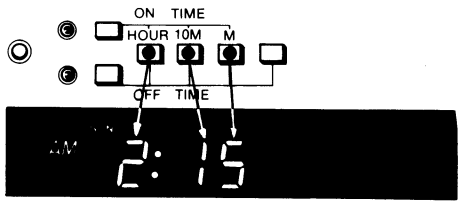
*** BRIGHT/DIM switch**
Select the brightness of the time indicator, BRIGHT or DIM.

1. Clock Time Adjustment

When the ac power cord is connected to a working outlet, the clock time starts operating, indicating

and the dots begin to blink. The clock time must then be set to the correct current time of day.
Open the timer control compartment to expose the controls.

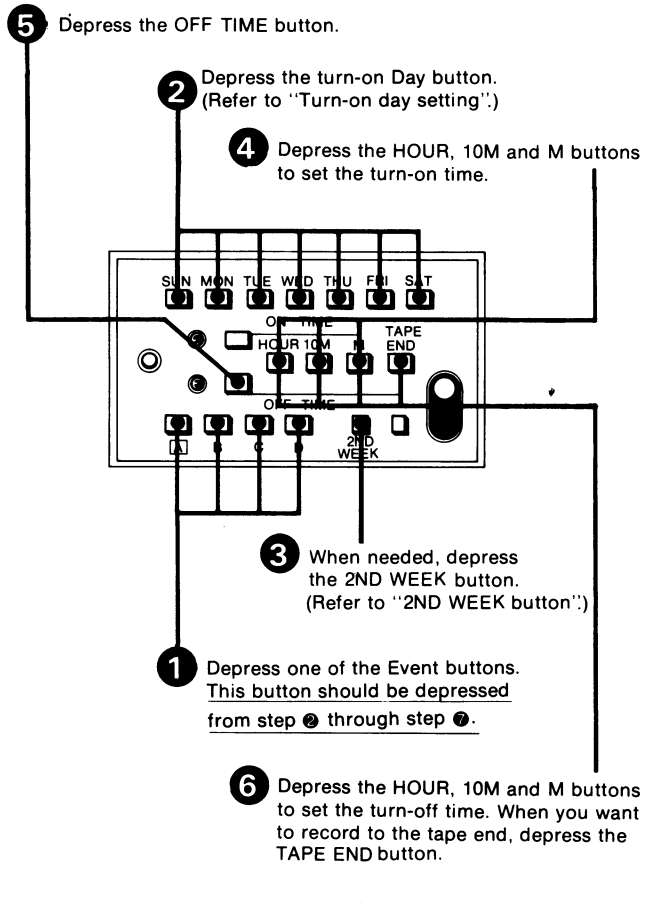

3 Depress the HOUR, 10M and M buttons until the clock time indicator shows the present time.
2 Depress the Day button of today.
SUN MON TUE WED THU FRI SAT
ON TIME
HOUR 10M M
CLOCK SET
1 Depress the CLOCK SET button.
This button should be depressed continuously from step 2 through step 3.
4 Release the CLOCK SET button at a time signal from a broadcast or telephone.
The clock time is now set and maintain the correct present time.



- In step ③ , first keep the button depressed to advance the digits, then push it stroke by stroke as the desired indication approaches.
- You may have to go through a complete 12 hour period to set the correct AM or PM period. "PM 12:00" indicates noon; "AM 12:00" indicates midnight.
- Whenever the CLOCK SET button is depressed, the clock is set back to 0 second of the current minute; when released, the clock begins to operate. Avoid unnecessary pressing of the button which may result in a clock time delay.
- When the CLOCK SET button is released, the upper dot begins blinking; after 30 seconds, the upper dot stops blinking and the lower dot blinks.
- The clock time and the timer settings are held while power is interrupted, or the ac power cord is disconnected for less than 10 minutes. (More than a 30-hour-charging is needed before the power interruption.)
  Refer to "POWER BACKUP" on page 1-3.

2. Timer Adjustment

With the aid of built-in timer, recording can be made while the recorder is unattended. For timer recording, set the turn-on time, day and turn-off time. Each Event button memorizes the on/off times of a program, for a total of four programs.
When the POWER switch is set to TIMER, the Event indicators of the events that are set will light.


5 Depress the OFF TIME button.
2 Depress the turn-on Day button. (Refer to "Turn-on day setting".)
4 Depress the HOUR, 10M and M buttons to set the turn-on time.
SUN MON TUE WED THU FRI SAT
ON TIME
HOUR 10M M
TAPE END
OFF TIME
A B C D
2ND WEEK
3 When needed, depress the 2ND WEEK button. (Refer to "2ND WEEK button".)
1 Depress one of the Event buttons. This button should be depressed from step 2 through step 7.
6 Depress the HOUR, 10M and M buttons to set the turn-off time. When you want to record to the tape end, depress the TAPE END button.

7 Depress the Channel select button to be recorded.

8 Release the Event button.
The clock time and day will be displayed.

Turn-on day setting

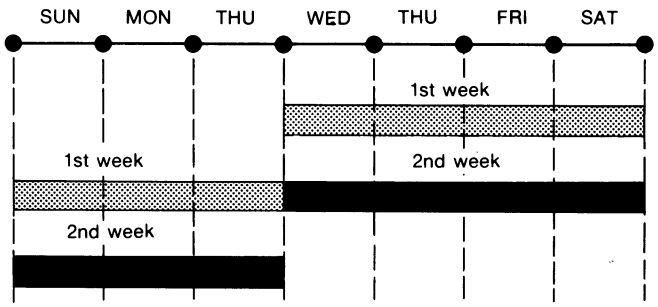
The turn-on day may be set for a particular day of a week or for every day. The indicator will light to indicate the turn-on day.

	Day indicator
An Event button is depressed. Recording will be started every day at the same setting time.	**SUN MON TUE WED THU FRI SAT**
When you want to start recording on Wednesday, depress the WED button.	SUN MON TUE **WED** THU FRI SAT
When you want to change the turn-on day to Tuesday, depress the TUE button.	SUN MON **TUE** WED THU FRI SAT
When you want to change the turn-on day to every day, depress the Day button whose indicator is lighting.	**SUN MON TUE WED THU FRI SAT**

- An everyday setting on an Event button will be memorized until you reset or clear it. Recording will be started everyday at the same setting time.
- A one day setting on the Event button A will be memorized and the recording will be repeated every subsequent week. One day settings on the Event buttons B, C and D will be cleared after the recording is performed.

2ND WEEK button

This button will work only when a one-day recording is set. Suppose today is Wednesday. When this button is depressed, the recording will start on the next Wednesday or later.



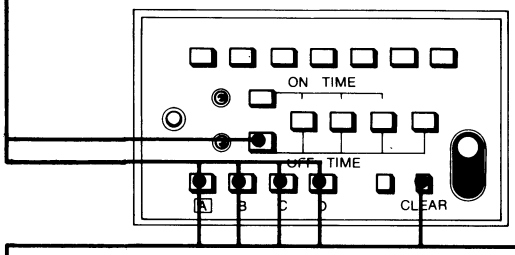
When you want to start recording on the 1st week after the 2ND WEEK button has been depressed, depress the 2ND WEEK button again.

When " — — : — — " is displayed.

The timer setting has not been made. Set the turn-on or off time. When the turn-off time is not set, the recording will continue to the tape end.

To check the turn-off time of an event

Depress the OFF TIME button while depressing the Event button.
The OFF TIME lamp will light and the event and its turn-off time will be displayed.



To check the turn-on time, day and the channel to be recorded.

Depress the Event button.
The ON TIME lamp will light and the event and its turn-on time and day will be displayed. The channel indicator will also light. The turn-on setting is also checked by depressing the ON TIME button with the Event button depressed when the turn-off time is displayed.

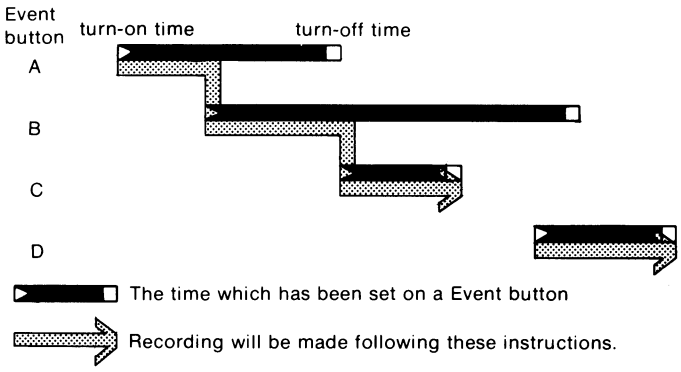
To clear the settings on an Event button

Depress the Event button and the CLEAR button simultaneously.
The Event indicator will go off and the timer settings on the pressed Event button will be cleared.

When the Event indicators and ERR lamp blink.

Timer settings on more than two Event buttons are overlapped. Check and reset the timer settings. If recording starts with the lamps blinking, it will proceed according to the illustration. If the same turn-on day and time is set on several buttons, the priority is A, B, C and D.

- When the turn-off time of the overlapped buttons is the tape end, the lamps do not blink.



POWER BACK UP

This machine has a power backup battery which holds the clock and timer settings during a power interruption. For the battery to operate, power has to be supplied to the recorder for more than 30 hours before the power interruption.

When a power interruption of less than 10 minutes has occurred.

Every operation except the timer will be stopped and every indicator will go off. During the interruption, the clock time and timer settings are held. When the power is resupplied, the current clock time will be indicated and the dots blink showing that the power interruption has occurred. While the dots blink, the timer adjustment cannot be made. Press the CLOCK SET button to stop the dots blinking. It may be a good idea to check the clock time.

If the power interruption has occurred during timer recording, the recording is stopped and will be started when the power is resupplied. However when an instantaneous power interruption of less than 0.5 second has occurred while timer recording is in process, the channel which is being recorded may be changed to another one.

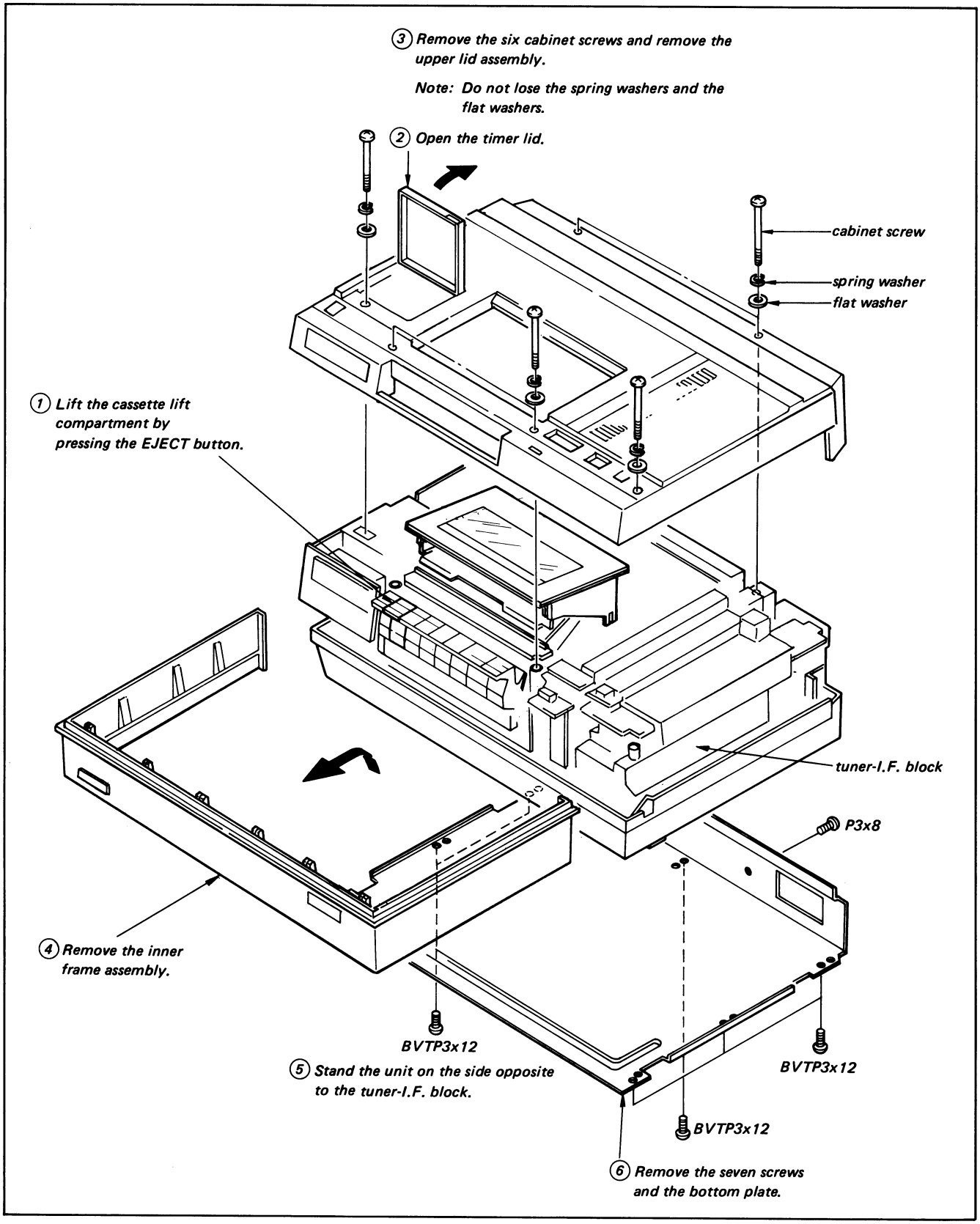
When a power interruption of more than 10 minutes has occurred.

Every indicator will go off. The clock time and timer settings will be cleared. When the power is resupplied, the clock time starts to operate indicating

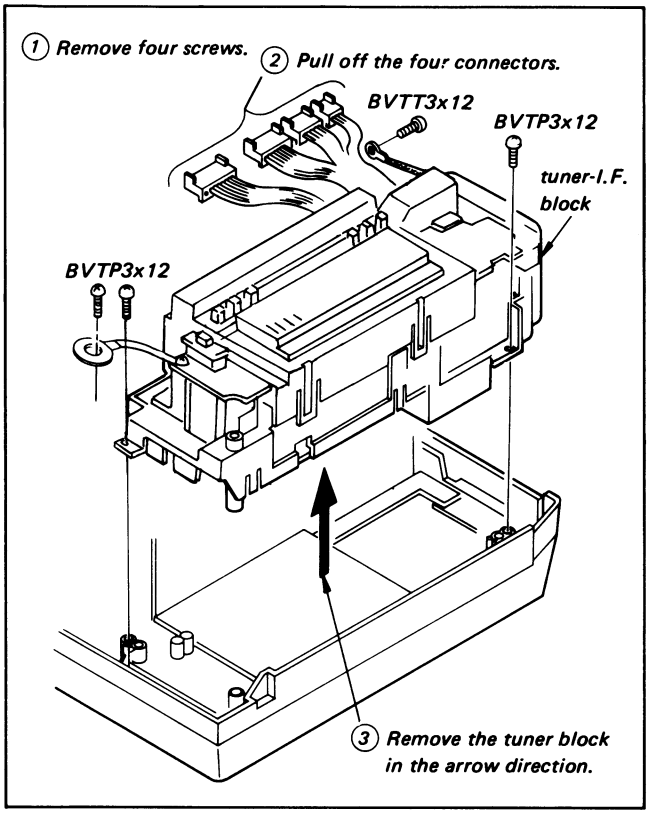
The dots blink and recording will not start. Set the clock time and timer.

1-5. DISASSEMBLY

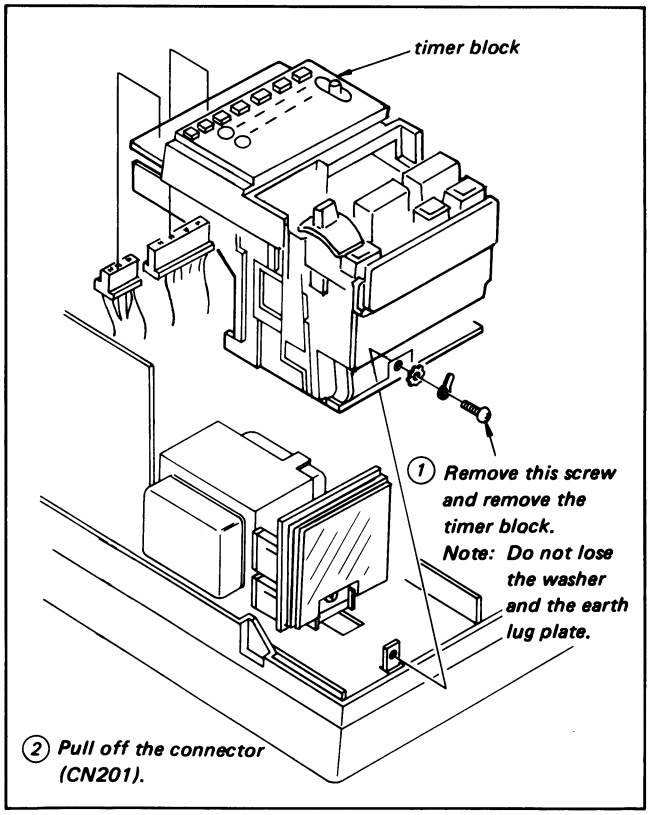
1-5-1. Cabinet Removal


③ Remove the six cabinet screws and remove the upper lid assembly.
Note: Do not lose the spring washers and the flat washers.
② Open the timer lid.
cabinet screw
spring washer
flat washer
① Lift the cassette lift compartment by pressing the EJECT button.
tuner-I.F. block
P3x8
④ Remove the inner frame assembly.
BVTP3x12
⑤ Stand the unit on the side opposite to the tuner-I.F. block.
BVTP3x12
BVTP3x12
⑥ Remove the seven screws and the bottom plate.

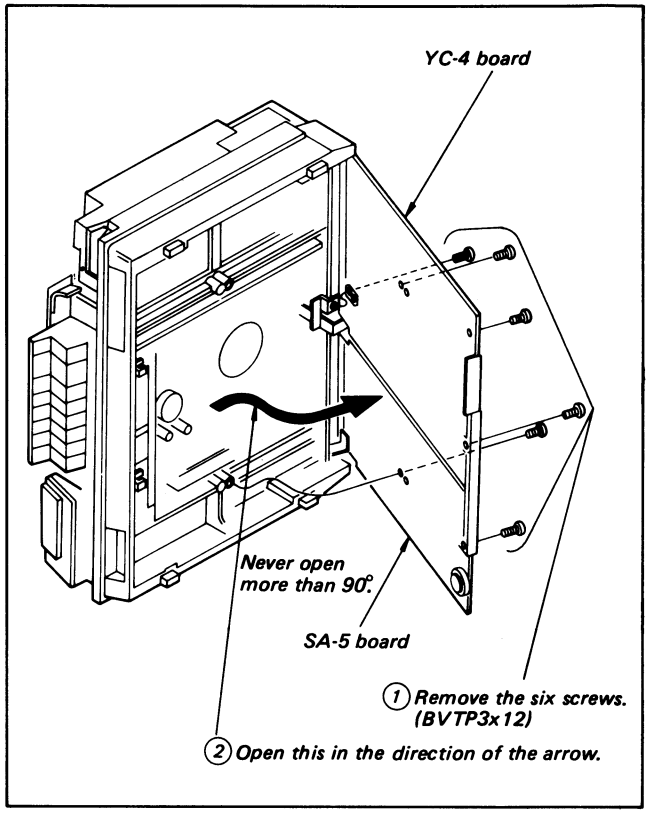
1-5-2. Tuner-I.F. Block Removal



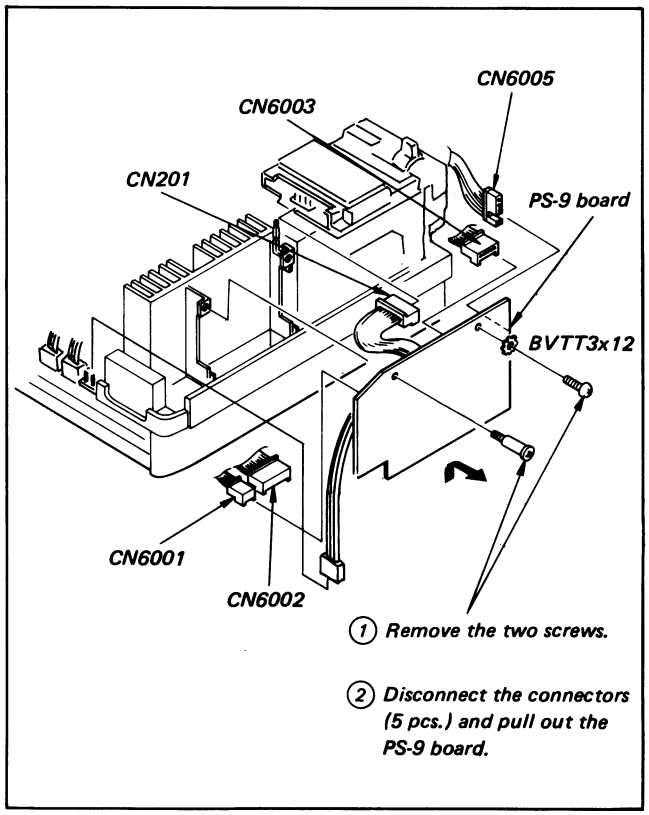
1-5-3. Timer Block Removal


timer block
① Remove this screw and remove the timer block.
Note: Do not lose the washer and the earth lug plate.
② Pull off the connector (CN201).

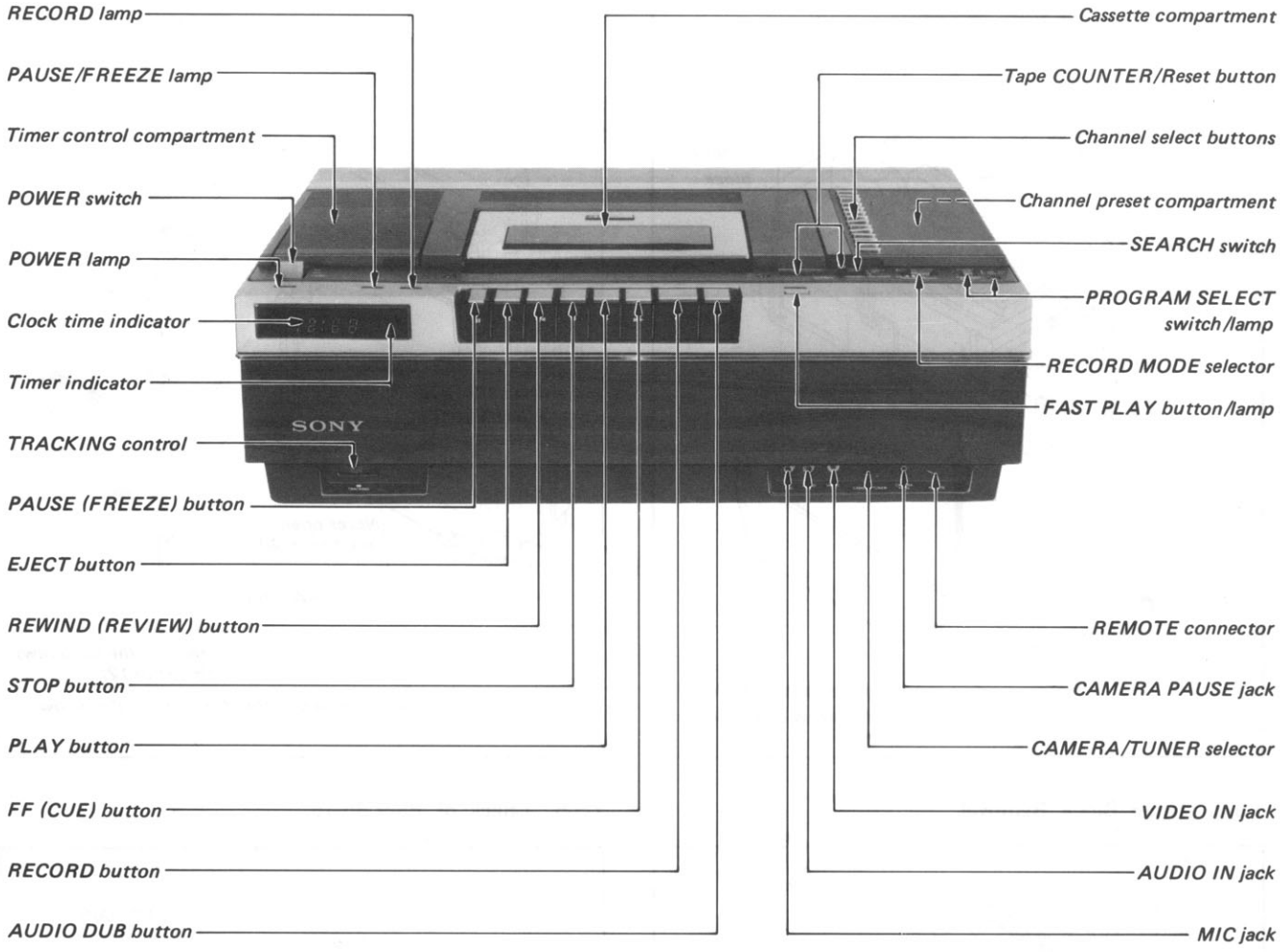
1-5-4. Check of YC-4 and SA-3 Boards

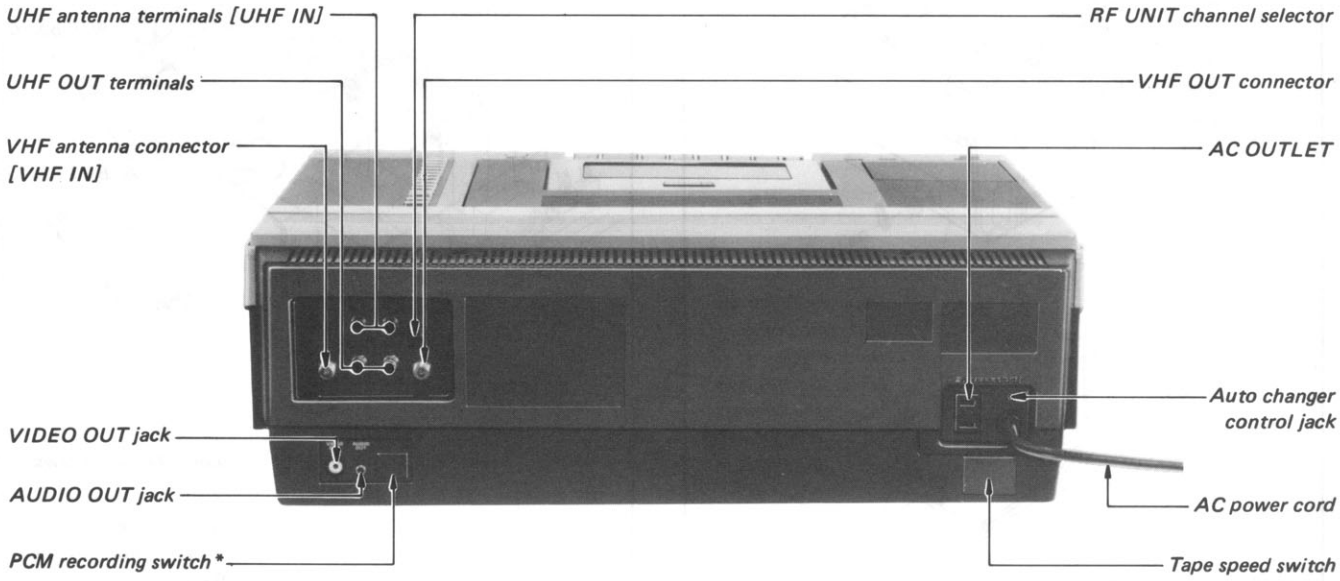


1-5-5. Check of PS-9 Board

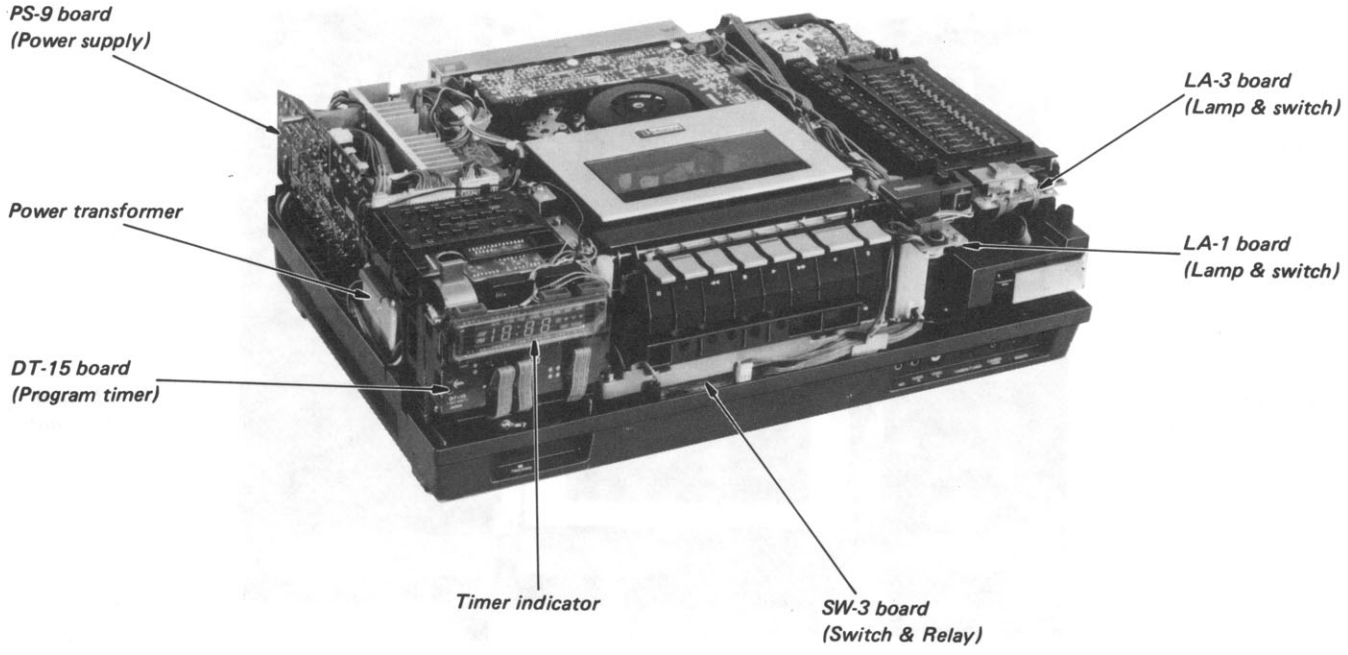


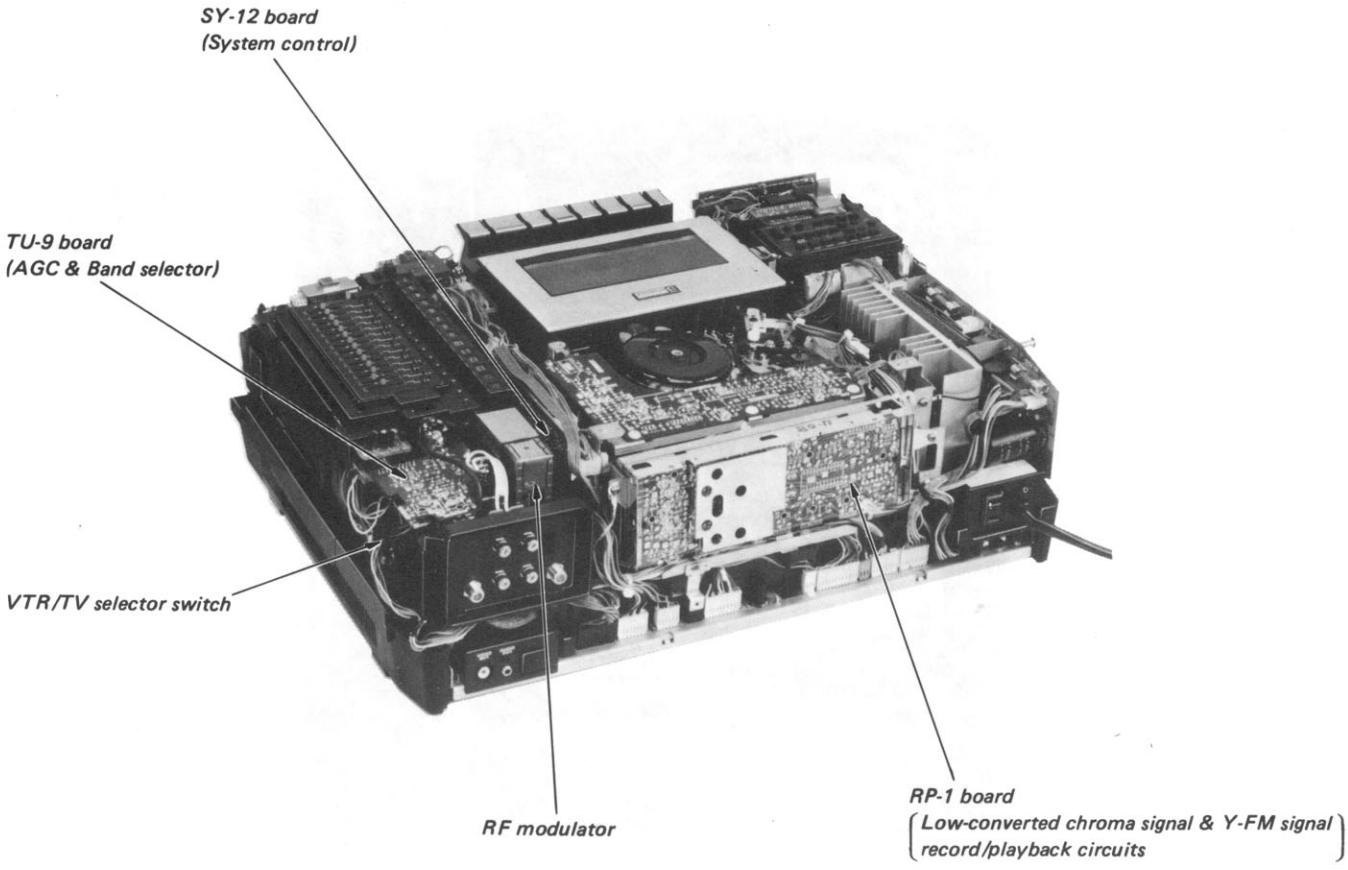
1-6. LOCATION OF PARTS AND CONTROLS

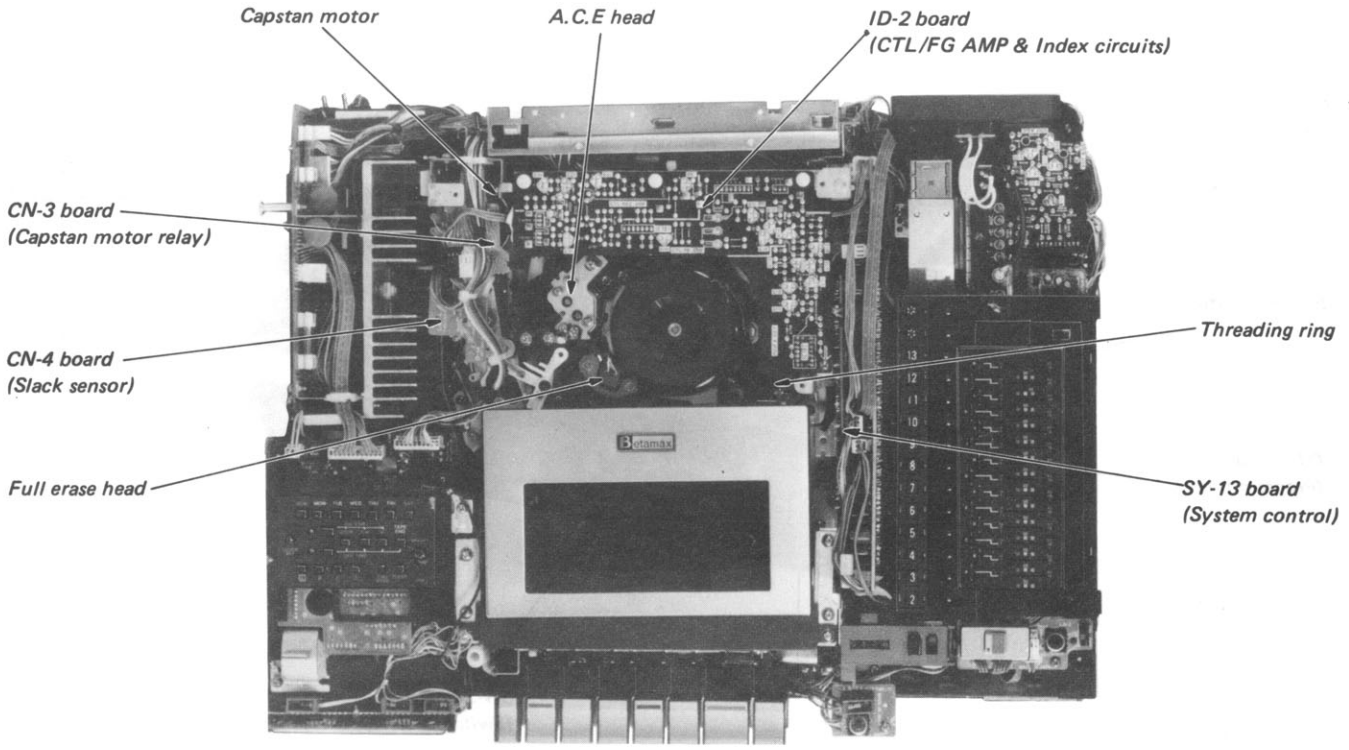


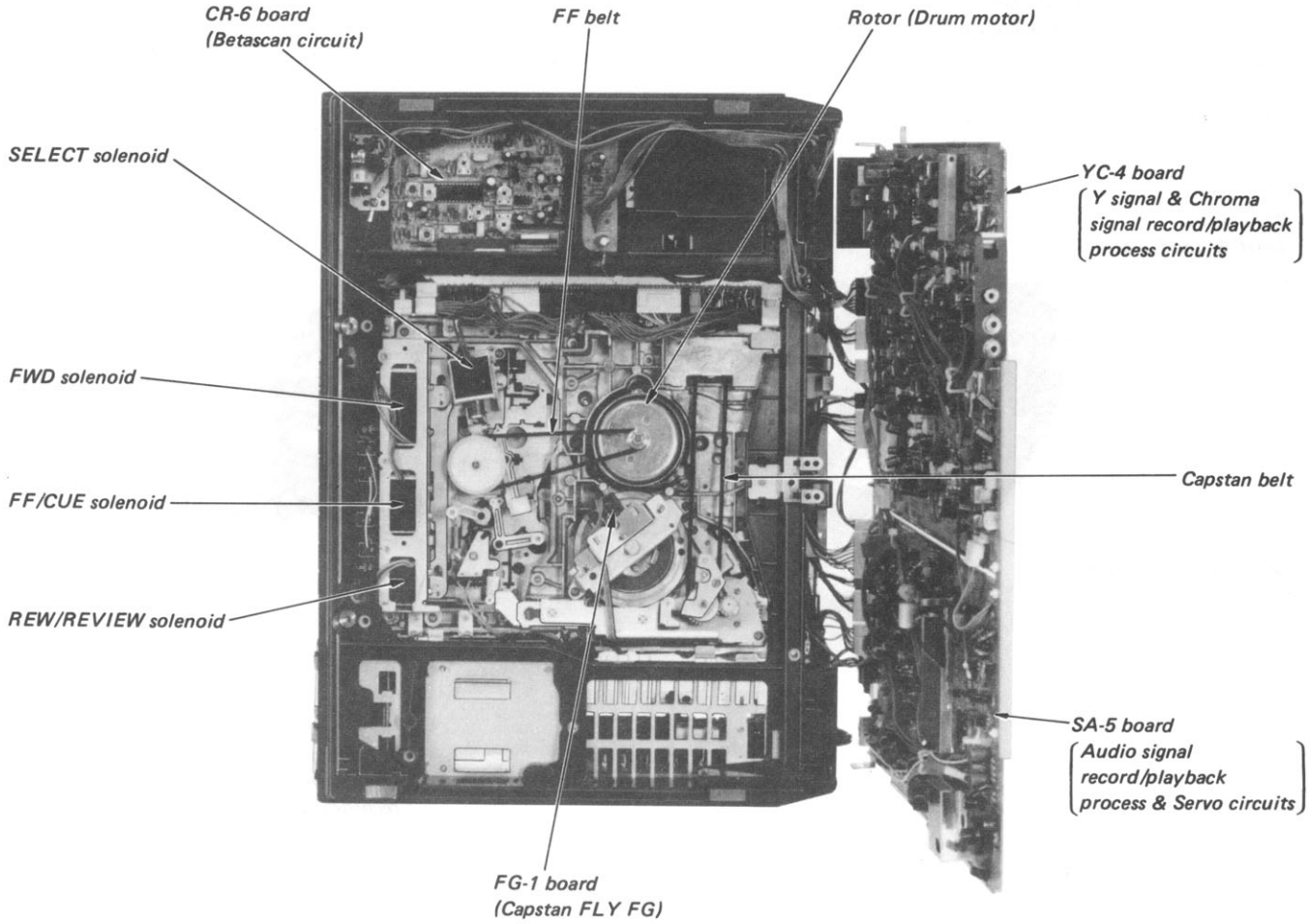


** During PCM recording when using the PCM adaptor, remove the rubber cover and set the switch to the left position.*

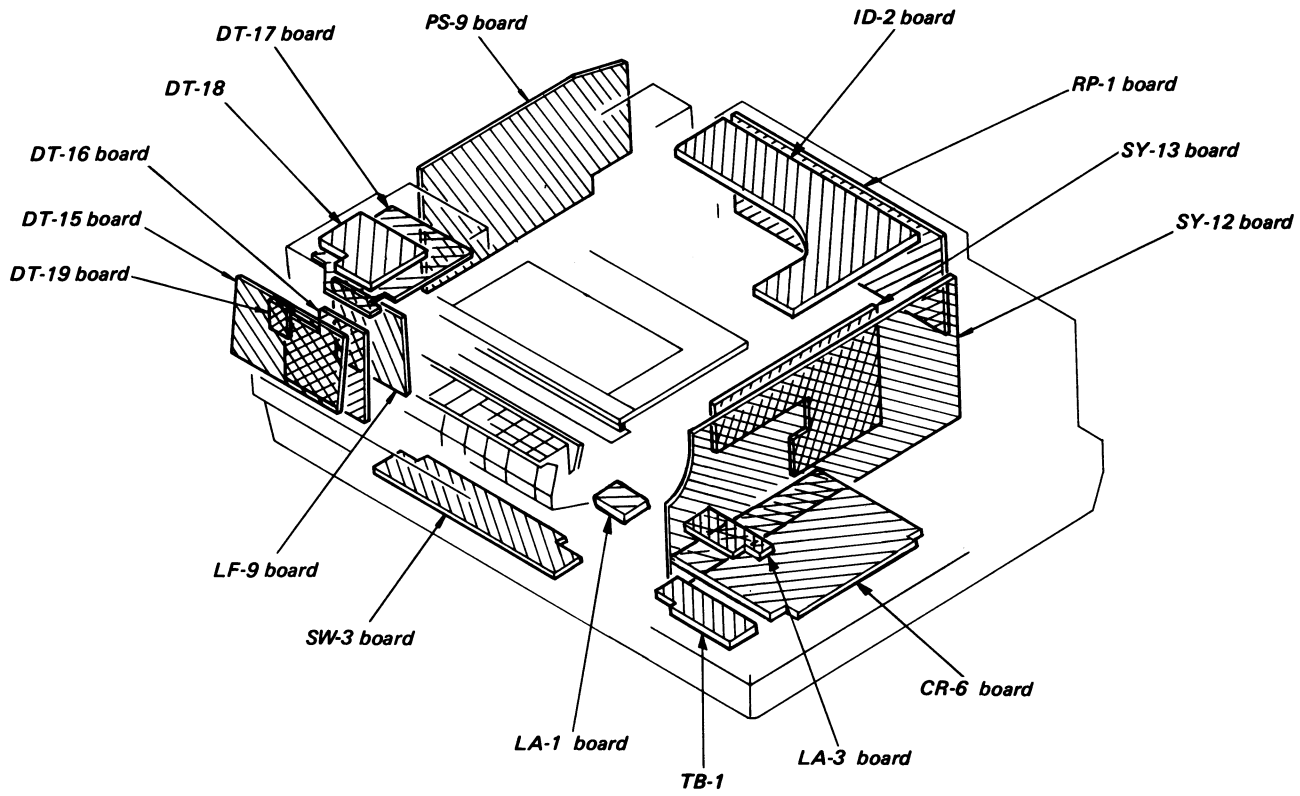

PS-9 board
(Power supply)
Power transformer
DT-15 board
(Program timer)
Timer indicator
SW-3 board
(Switch & Relay)
LA-3 board
(Lamp & switch)
LA-1 board
(Lamp & switch)

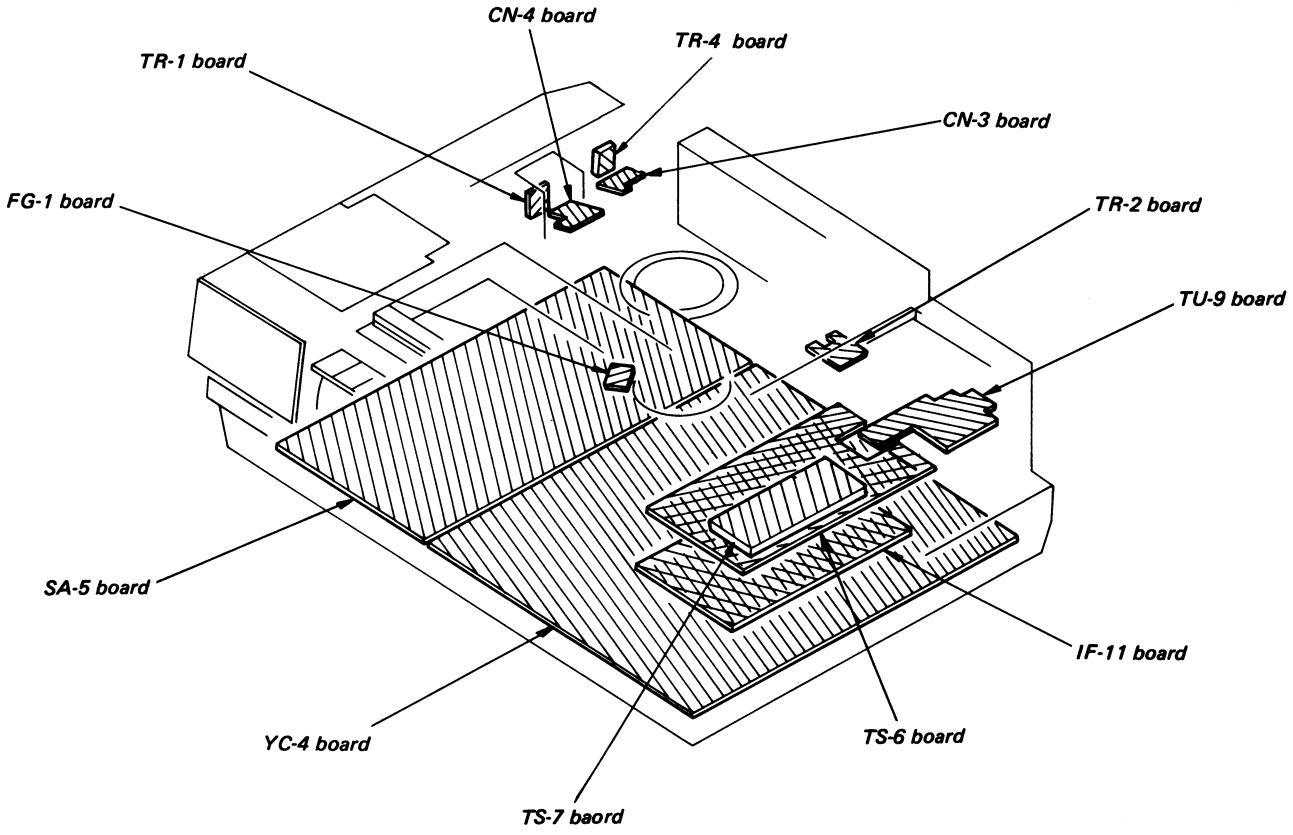

SY-12 board
(System control)
TU-9 board
(AGC & Band selector)
VTR/TV selector switch
RF modulator
RP-1 board
(Low-converted chroma signal & Y-FM signal record/playback circuits)


Capstan motor
A.C.E head
ID-2 board
(CTL/FG AMP & Index circuits)
CN-3 board
(Capstan motor relay)
CN-4 board
(Slack sensor)
Full erase head
Threading ring
SY-13 board
(System control)


CR-6 board
(Betascan circuit)
FF belt
Rotor (Drum motor)
SELECT solenoid
YC-4 board
Y signal & Chroma
signal record/playback
process circuits
FWD solenoid
Capstan belt
FF/CUE solenoid
REW/REVIEW solenoid
SA-5 board
Audio signal
record/playback
process & Servo circuits
FG-1 board
(Capstan FLY FG)

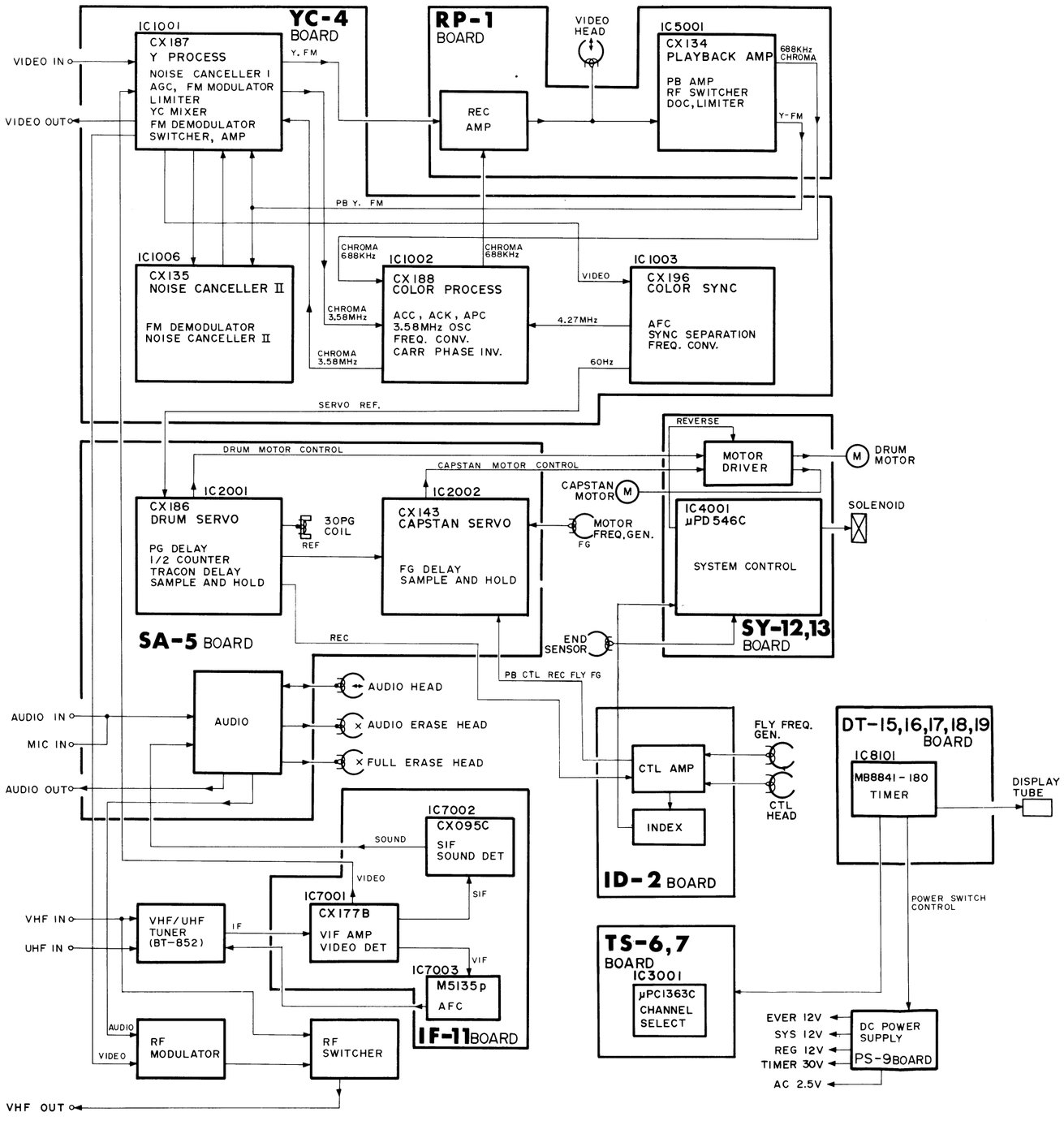
CIRCUIT BOARDS LOCATION



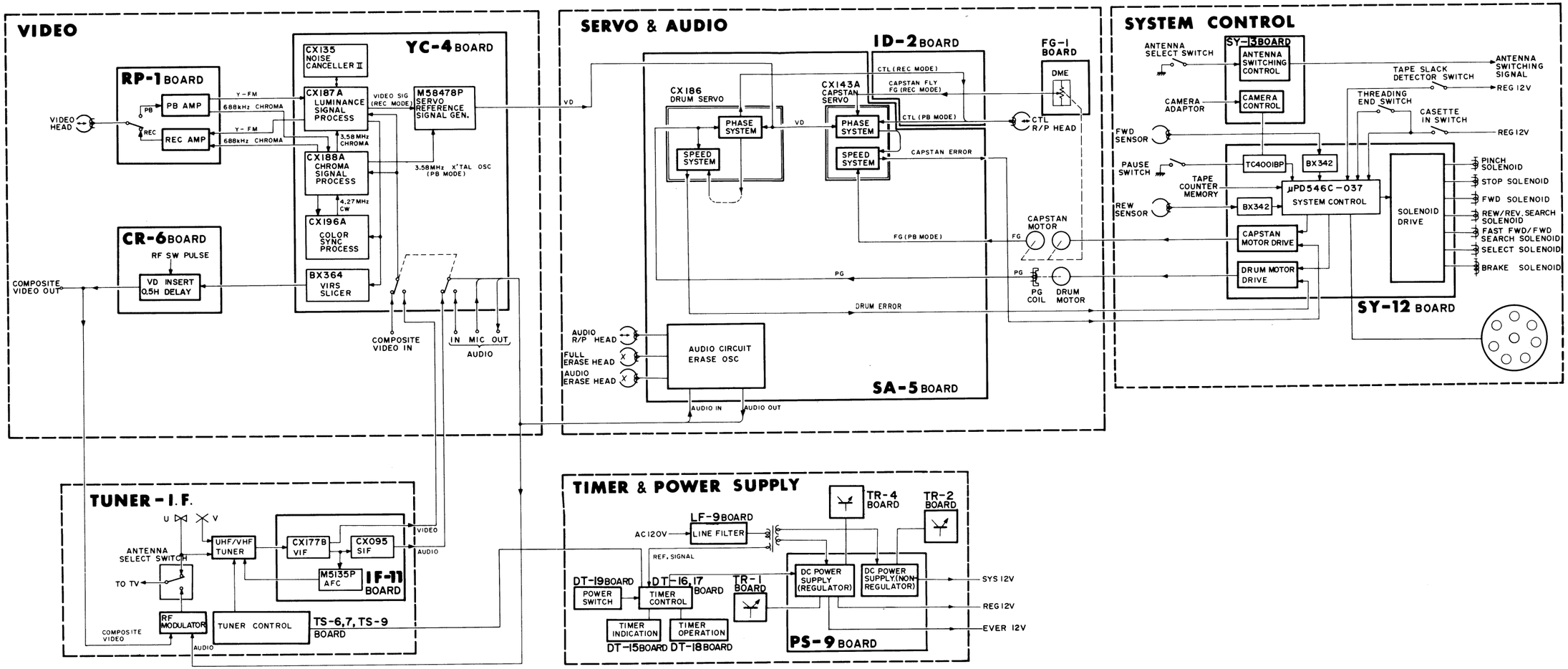


SECTION 2
BLOCK DIAGRAMS

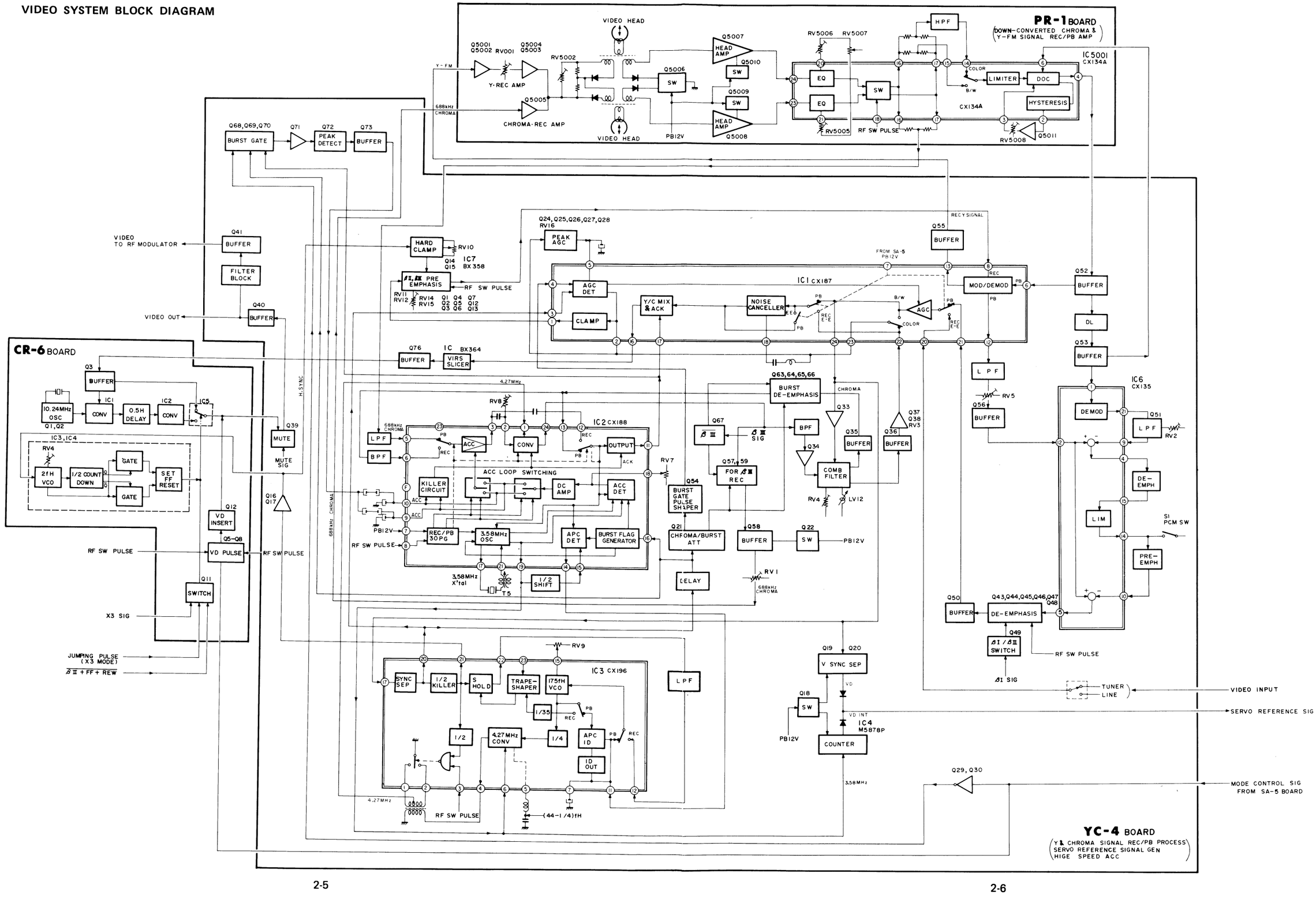
OVERALL BLOCK DIAGRAM (1)



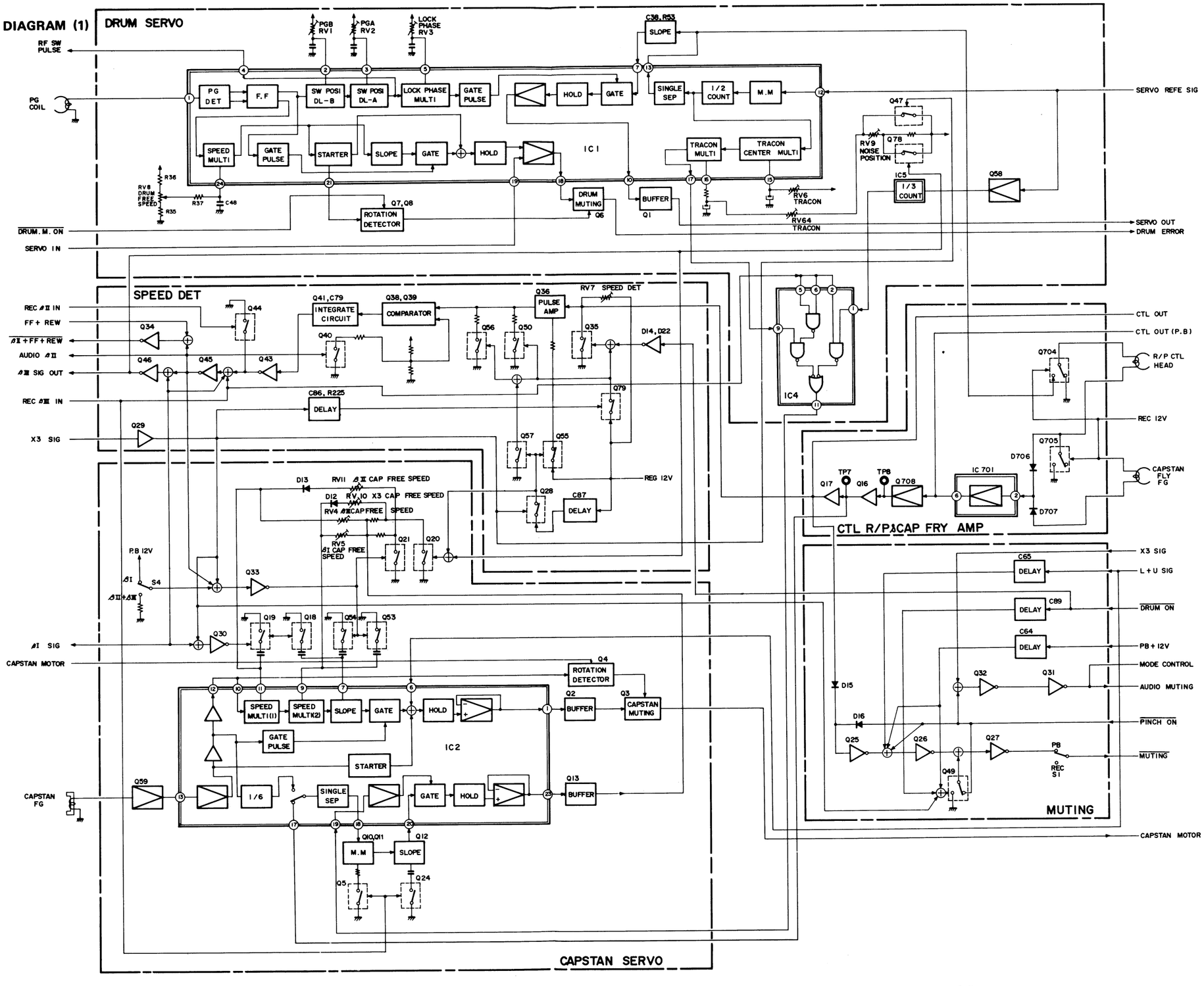
OVERALL BLOCK DIAGRAM (2)



VIDEO SYSTEM BLOCK DIAGRAM

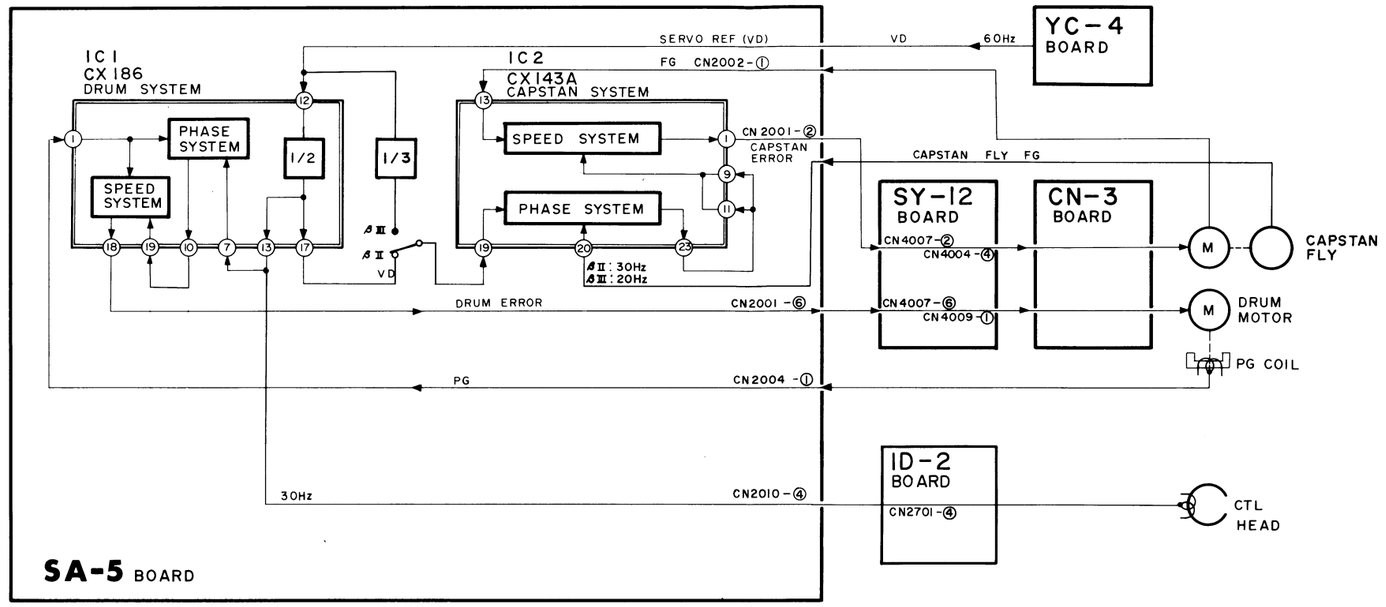


SERVO SYSTEM BLOCK DIAGRAM (1)

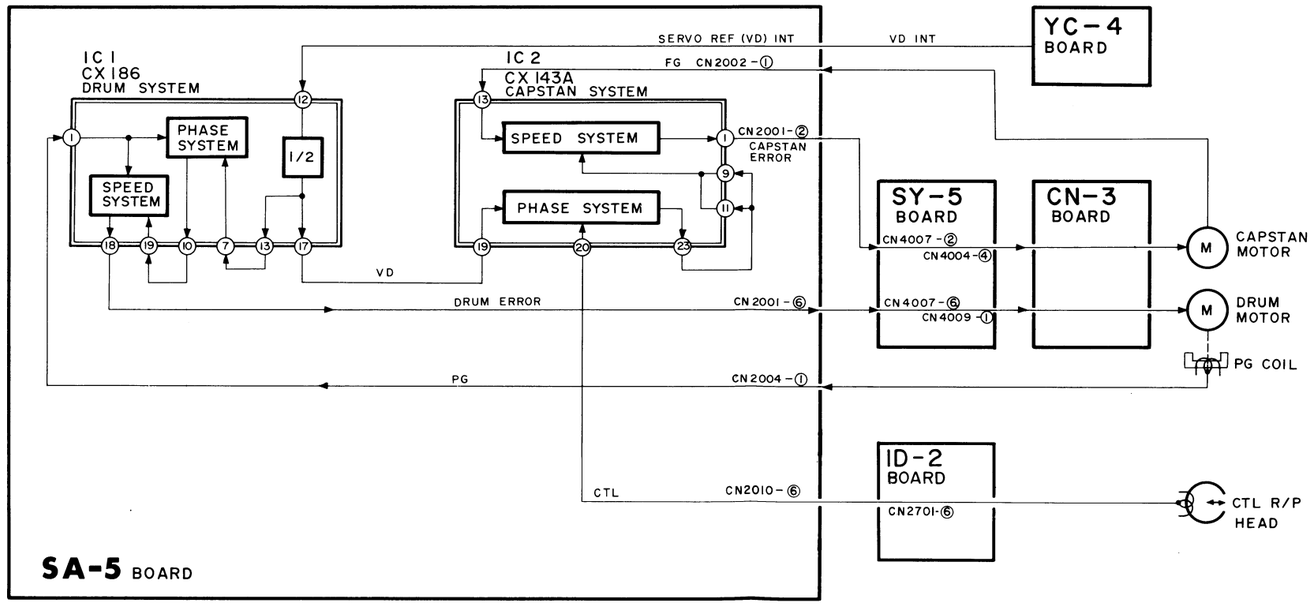


SERVO SYSTEM BLOCK DIAGRAM (2)

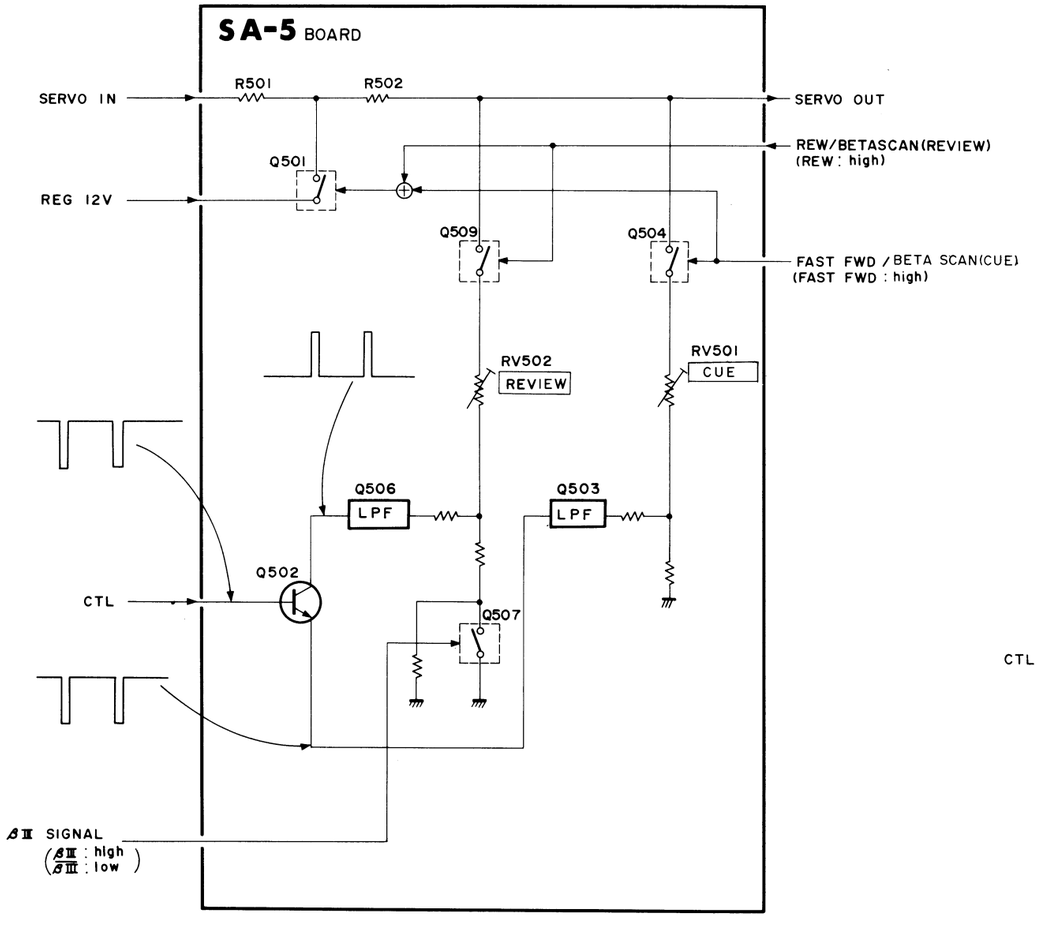
–REC MODE–



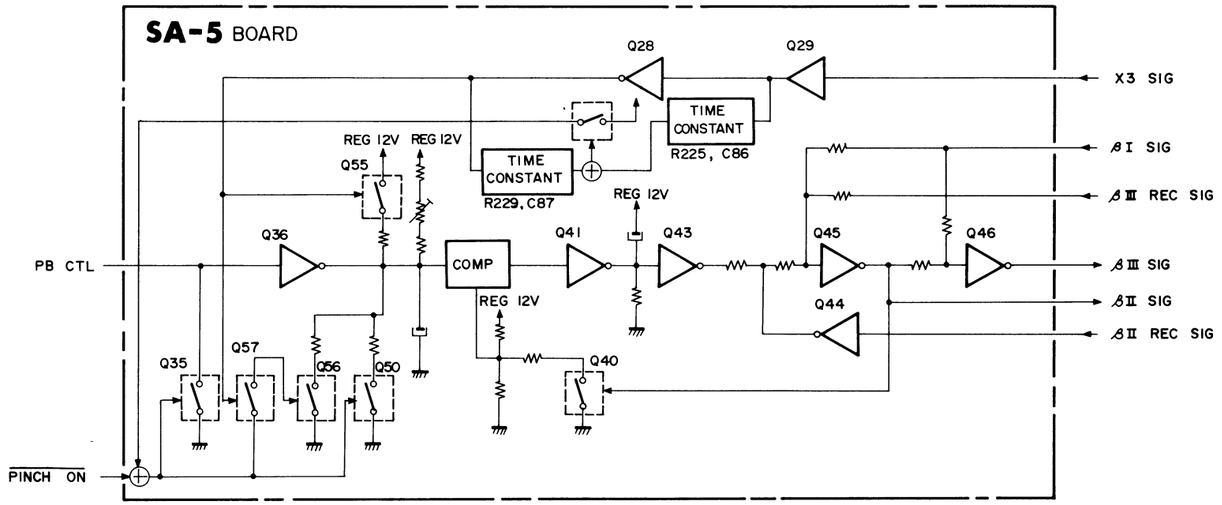
–PB MODE–



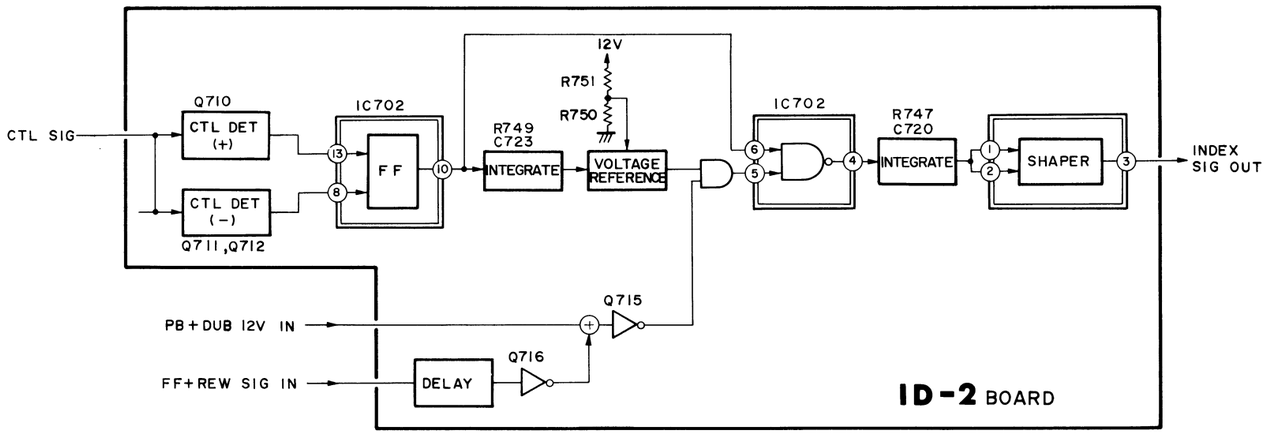
BETASCAN (CUE & REVIEW) DRUM SPEED CONTROL BLOCK DIAGRAM



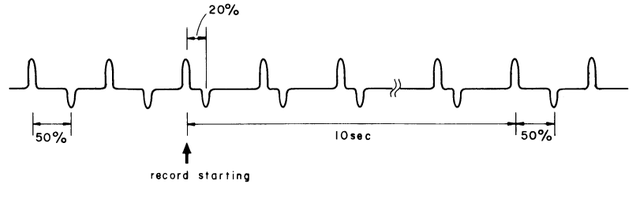
TAPE SPEED DETECTOR BLOCK DIAGRAM



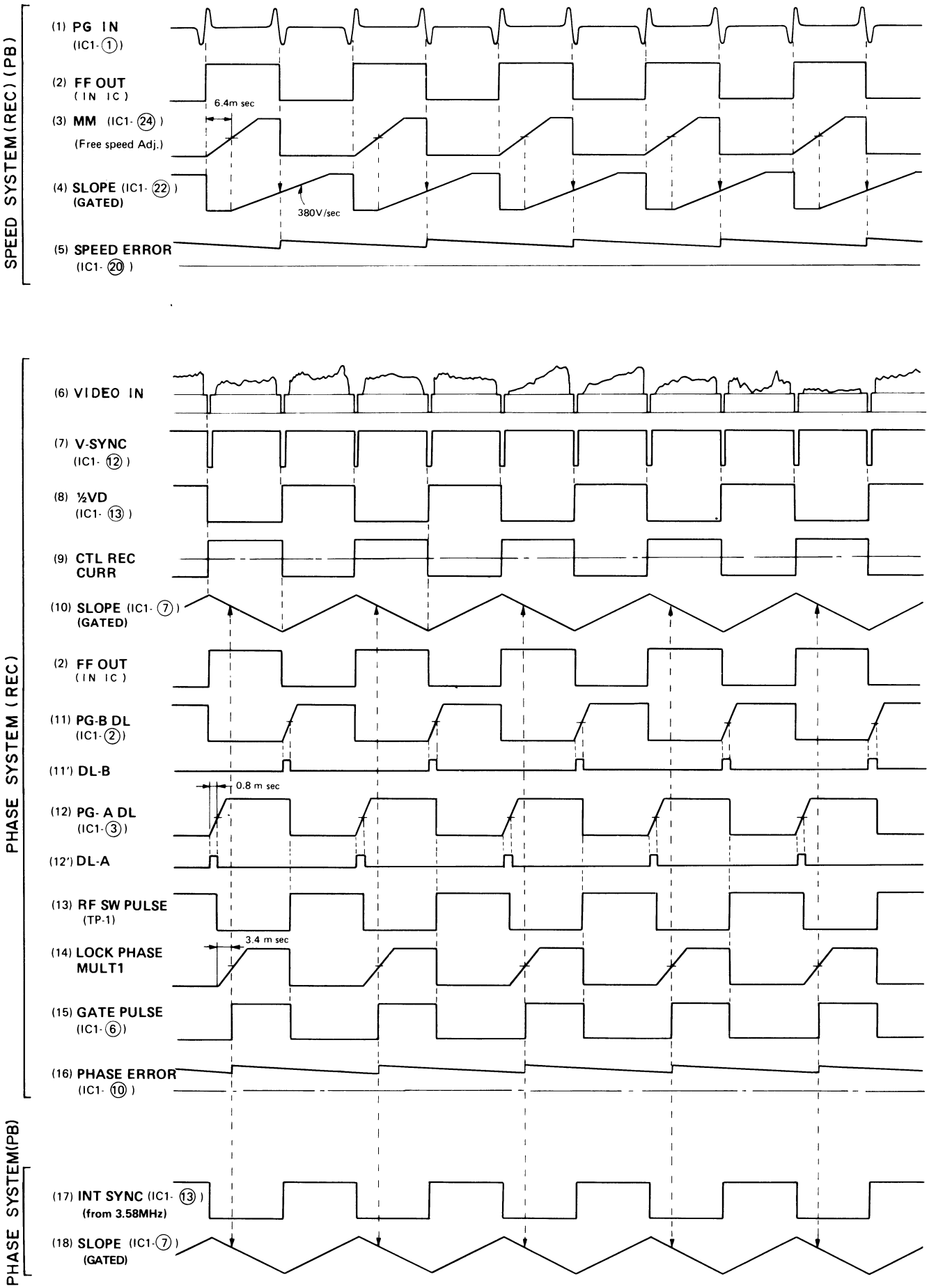
AUTO PROGRAM SEARCH BLOCK DIAGRAM



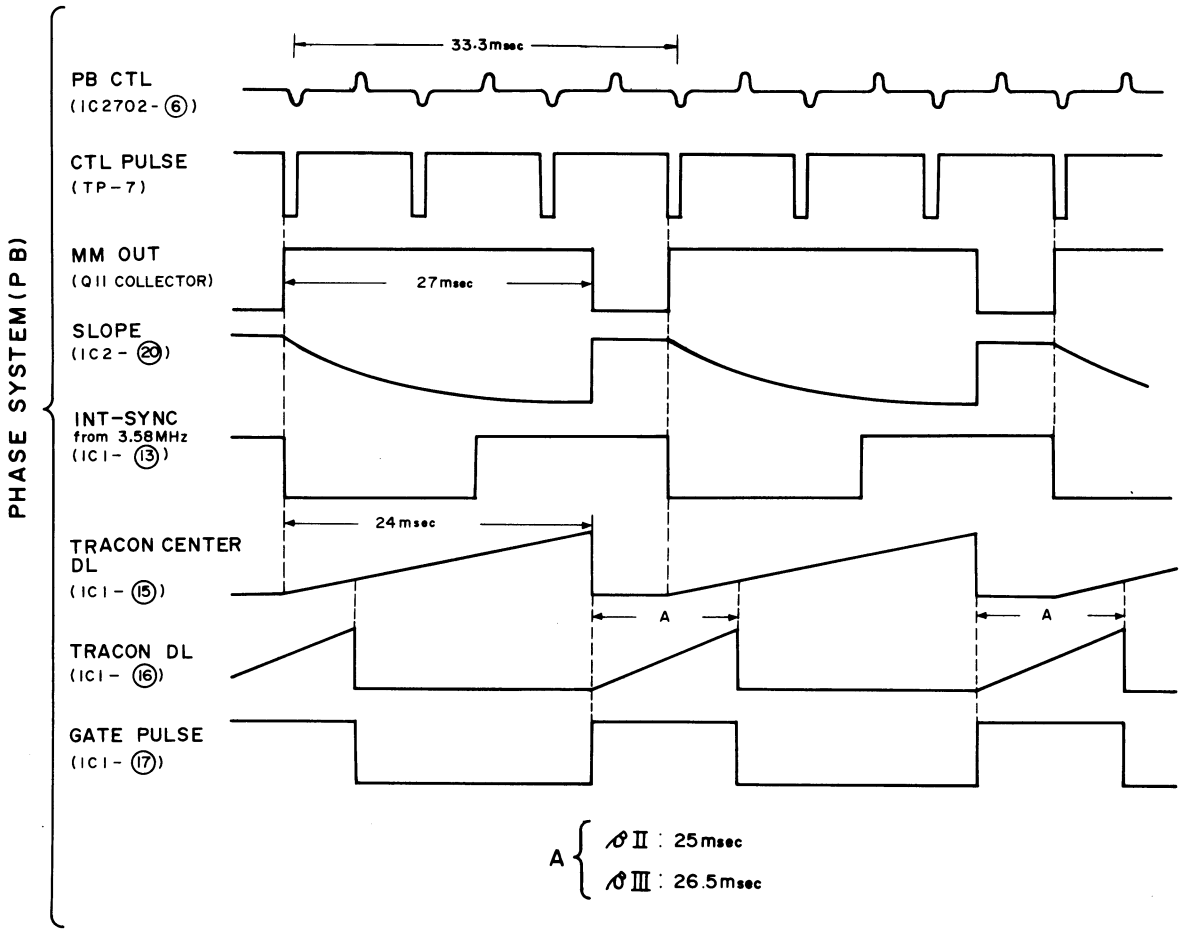
Record control track signal



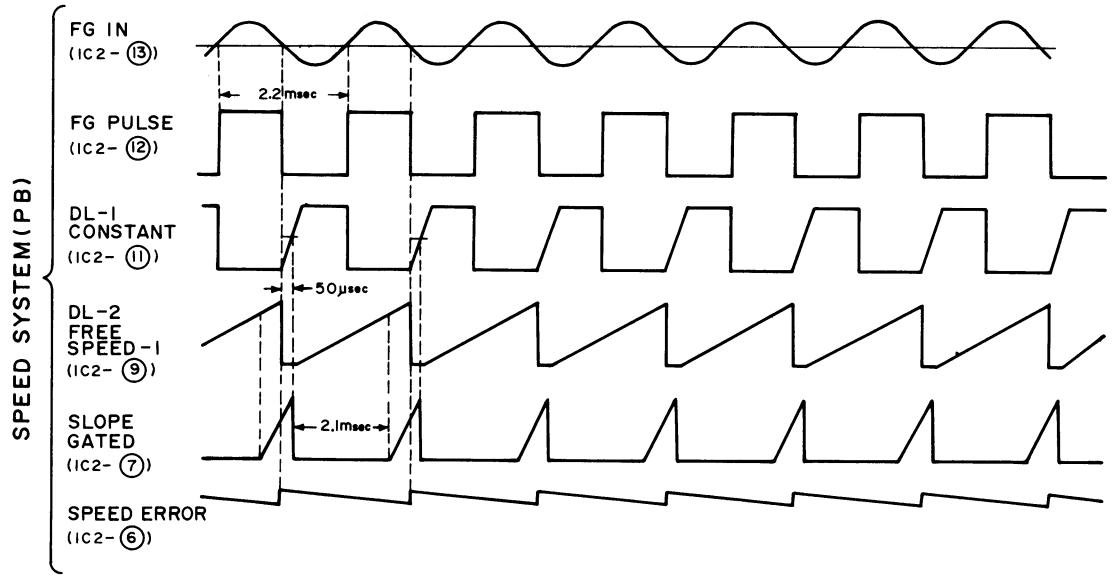
DRUM SERVO TIMING CHART



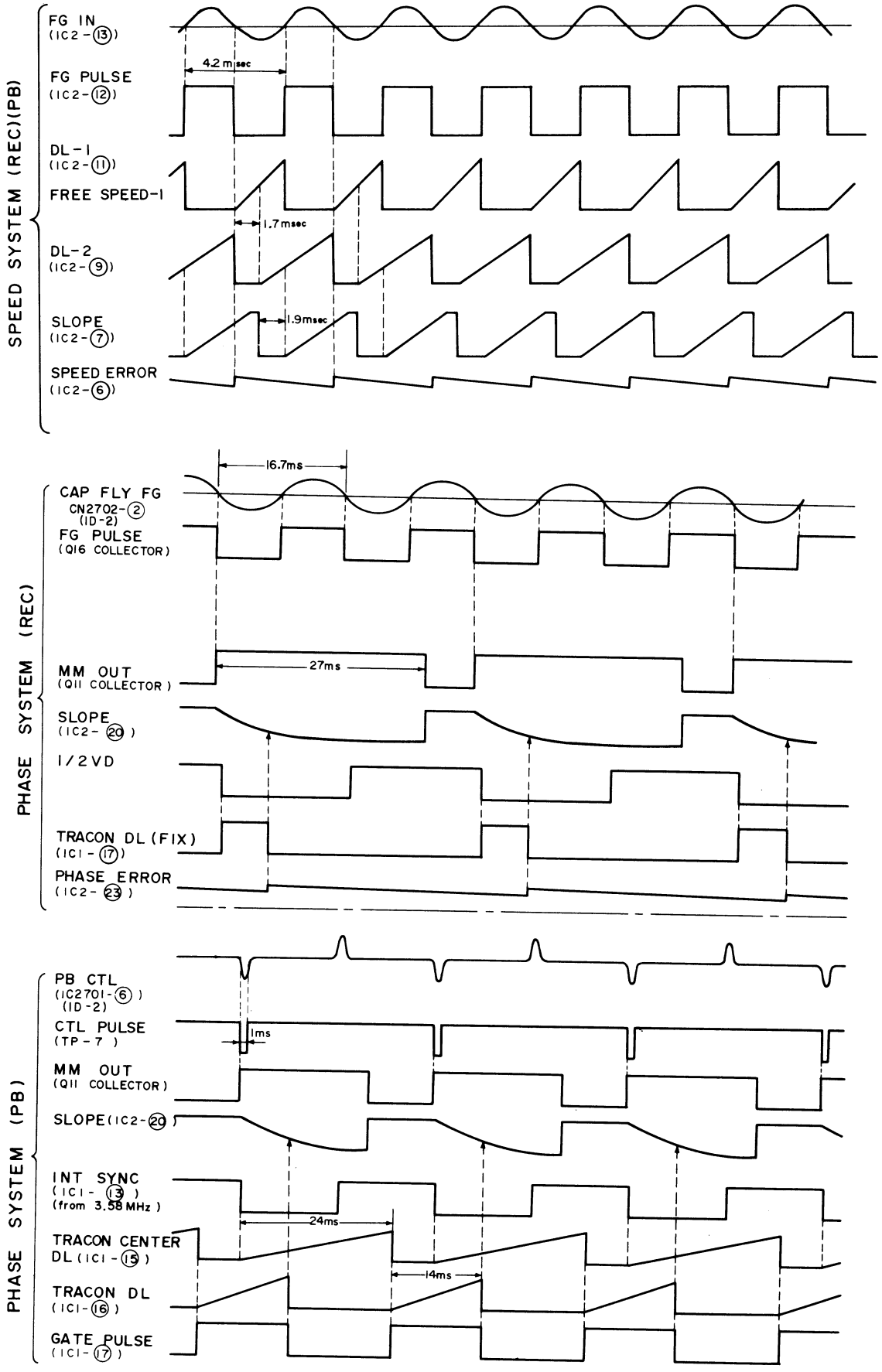
CAPSTAN SERVO TIMING CHART: FAST PLAY (X3)



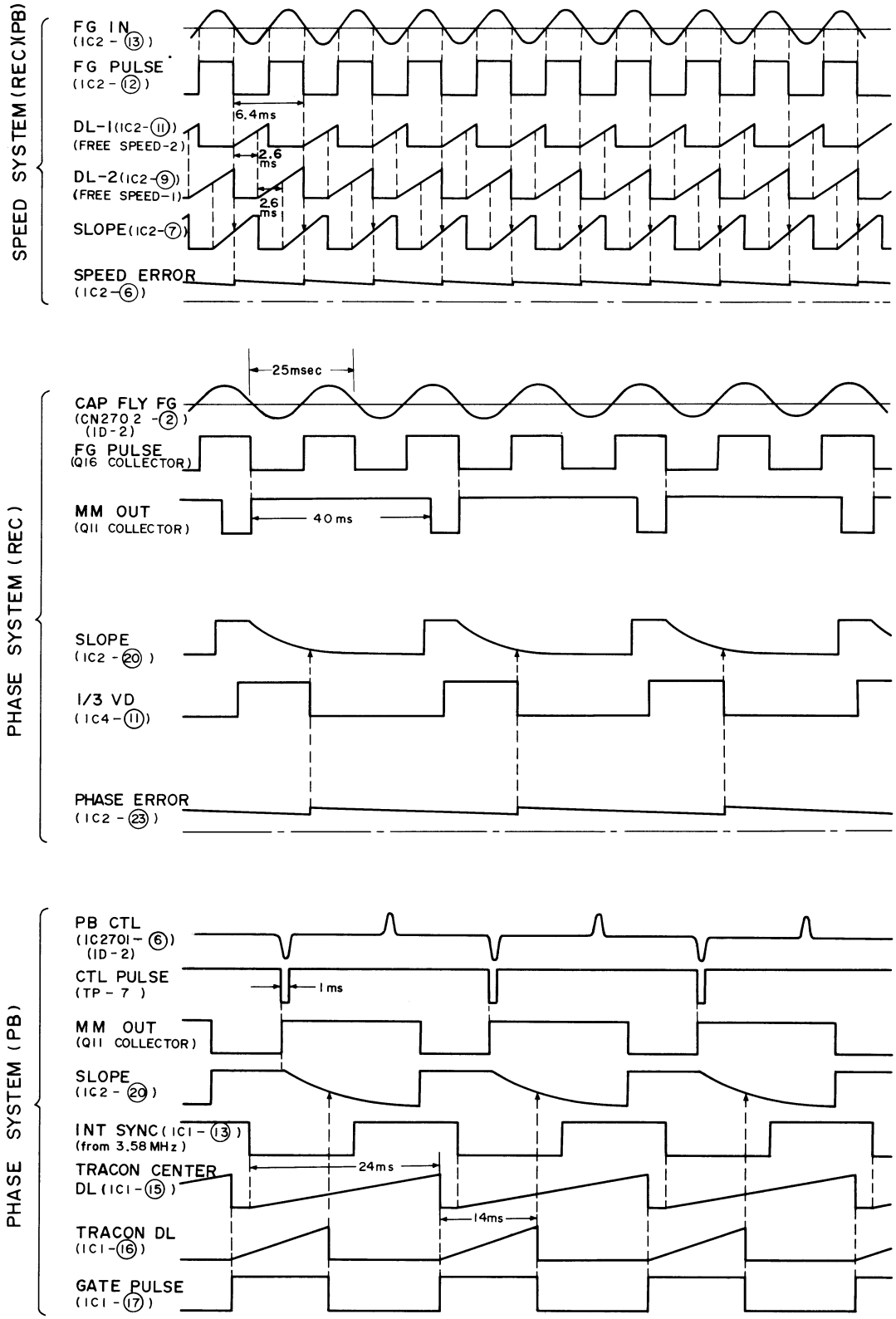
CAPSTAN SERVO TIMING CHART (βI)



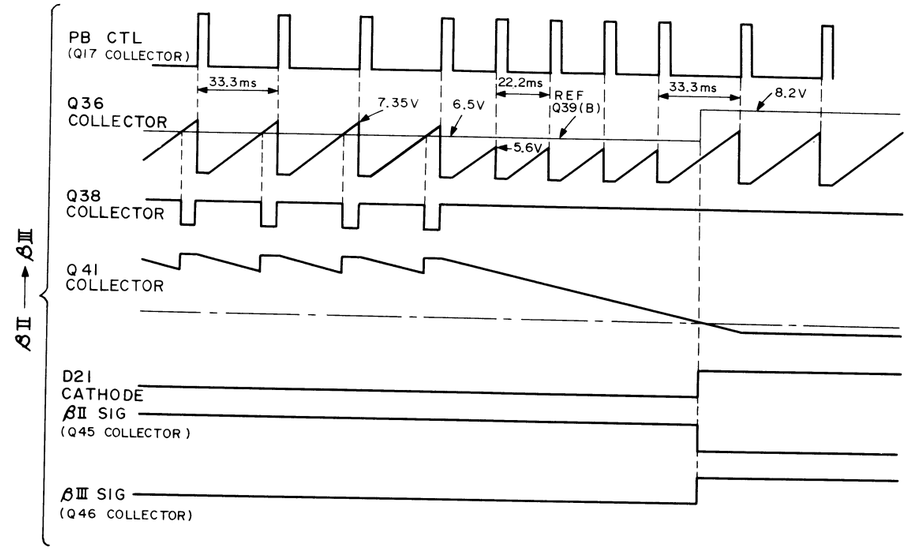
CAPSTAN SERVO TIMING CHART (βII)

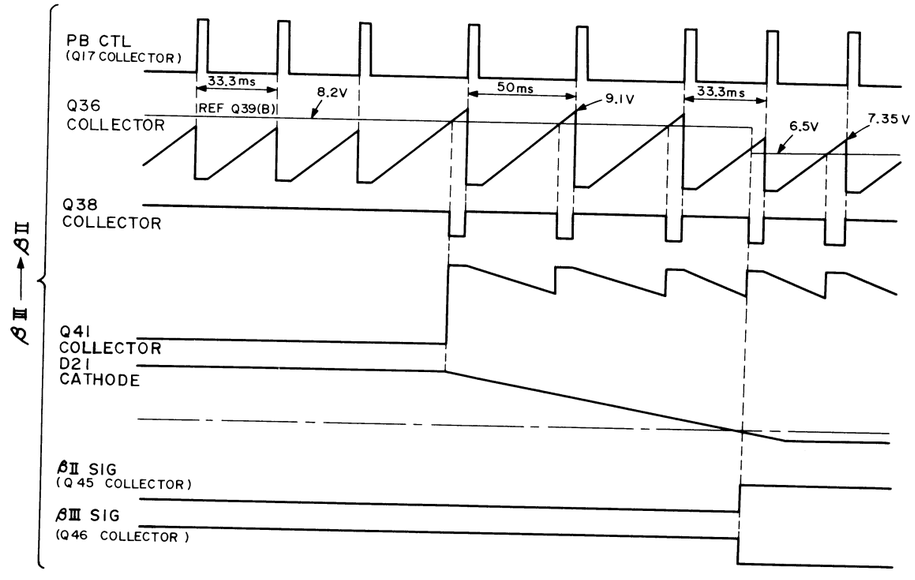


CAPSTAN SERVO TIMING CHART (βIII)

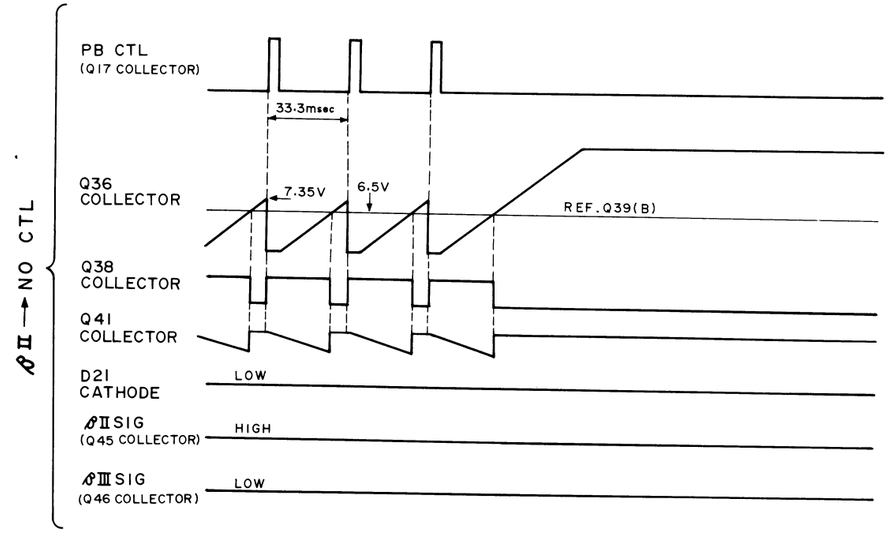


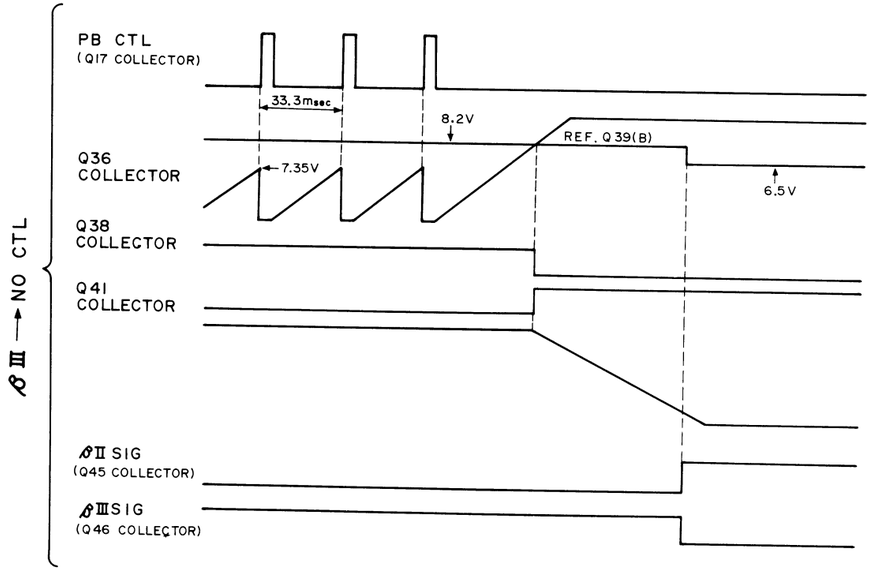
TAPE SPEED AUTOMATIC SWITCHING TIMING CHART (1)



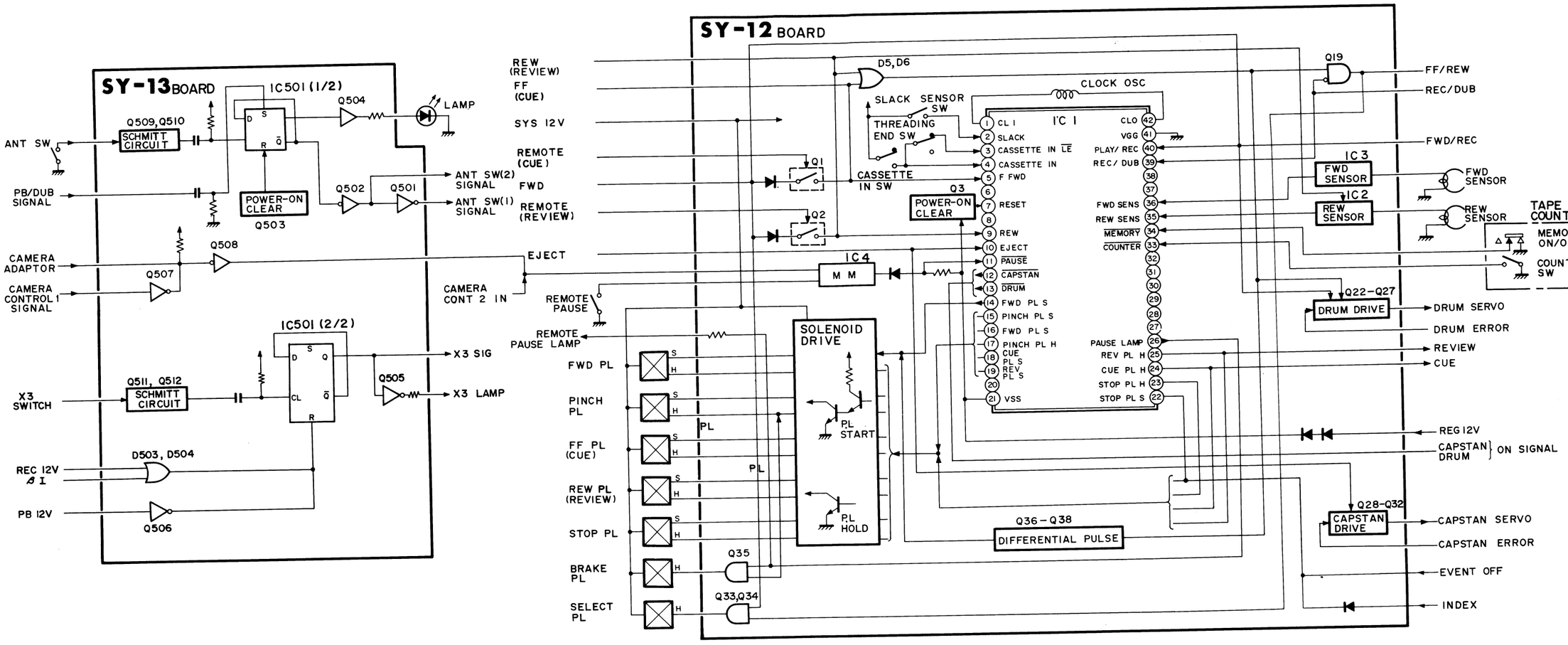


TAPE SPEED AUTOMATIC SWITCHING TIMING CHART (2)

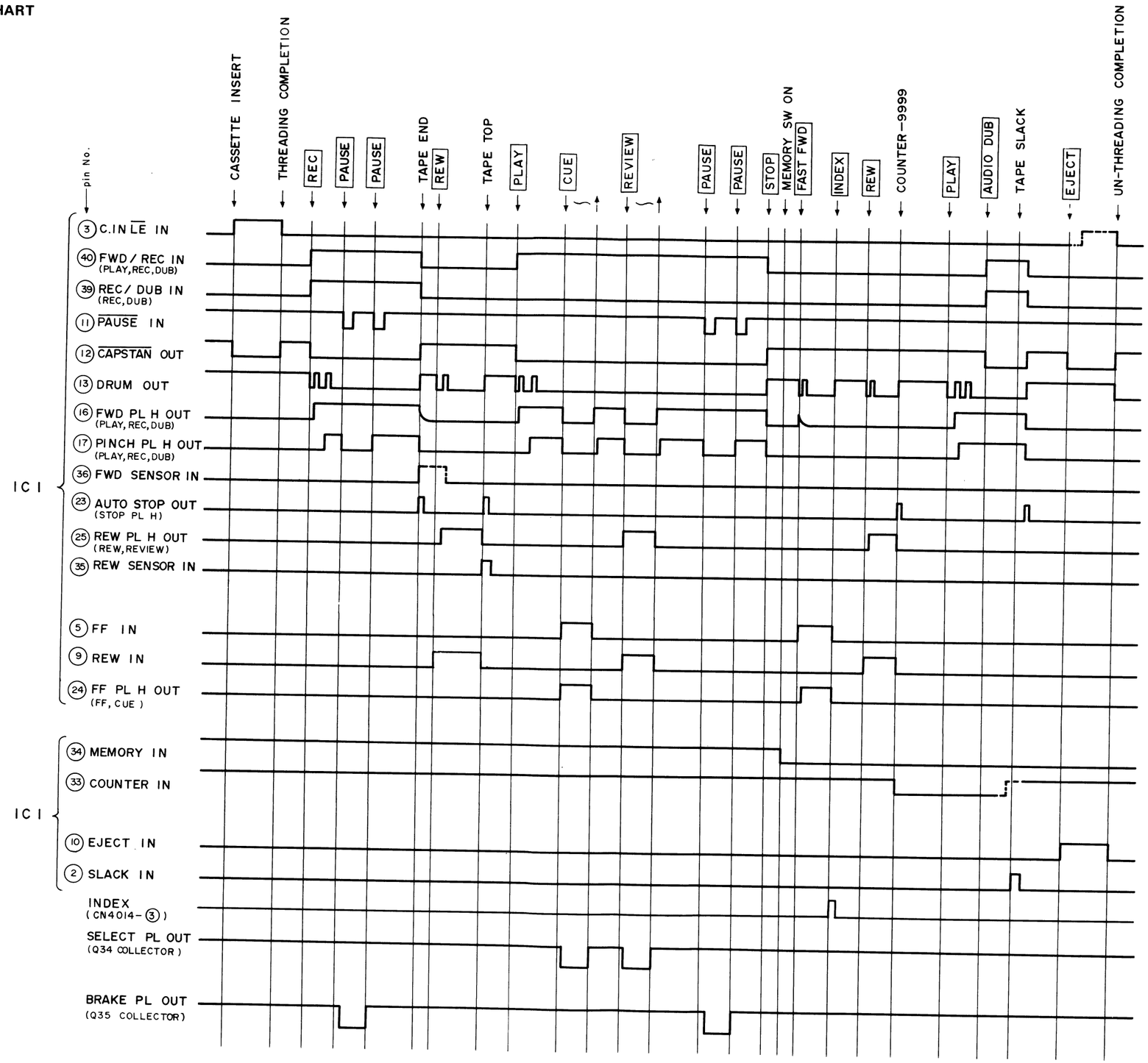




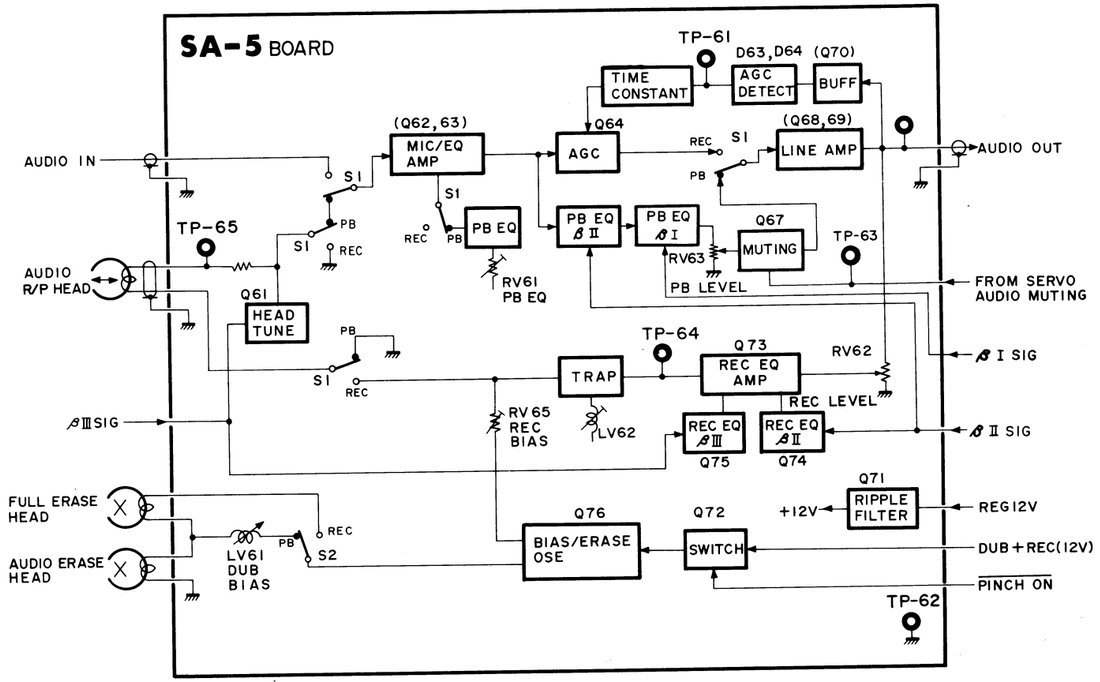
SYSTEM CONTROL BLOCK DIAGRAM



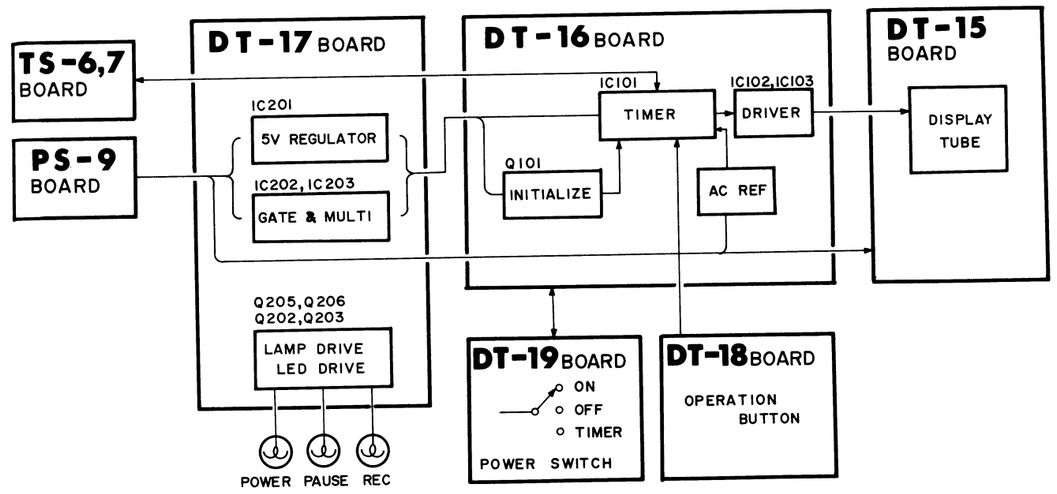
SYSTEM CONTROL TIMING CHART



AUDIO BLOCK DIAGRAM

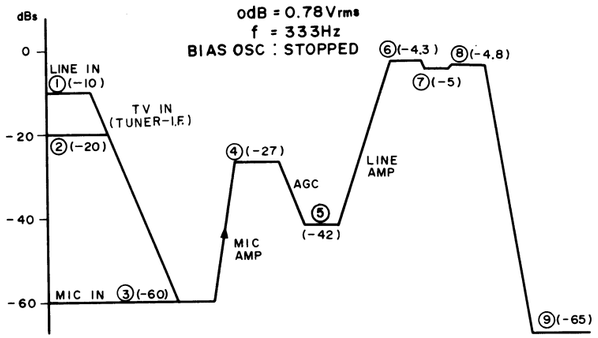


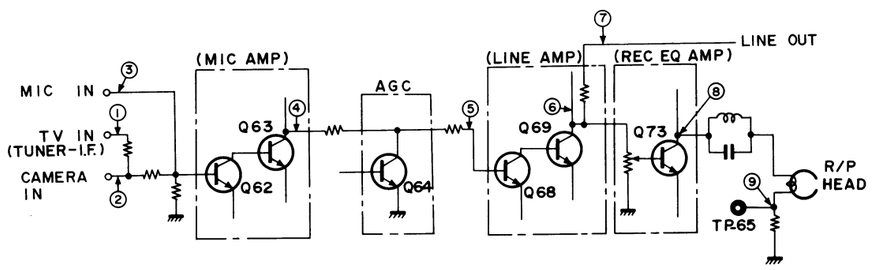
TIMER BLOCK DIAGRAM



AUDIO LEVEL DIAGRAM

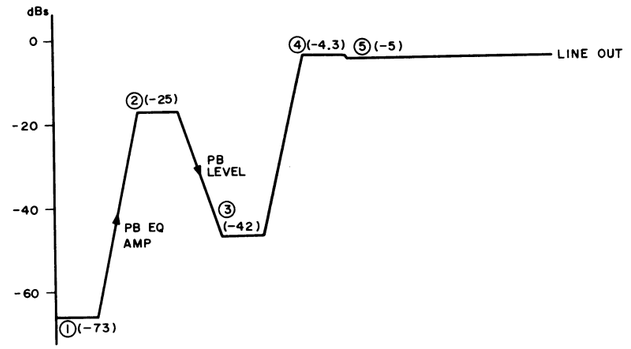
–REC MODE–

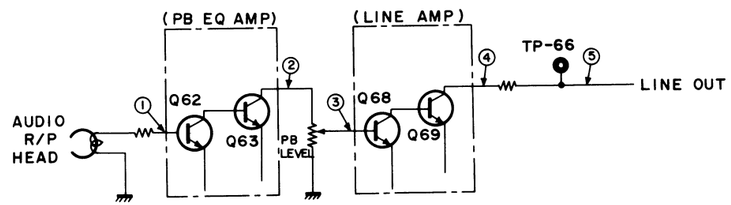




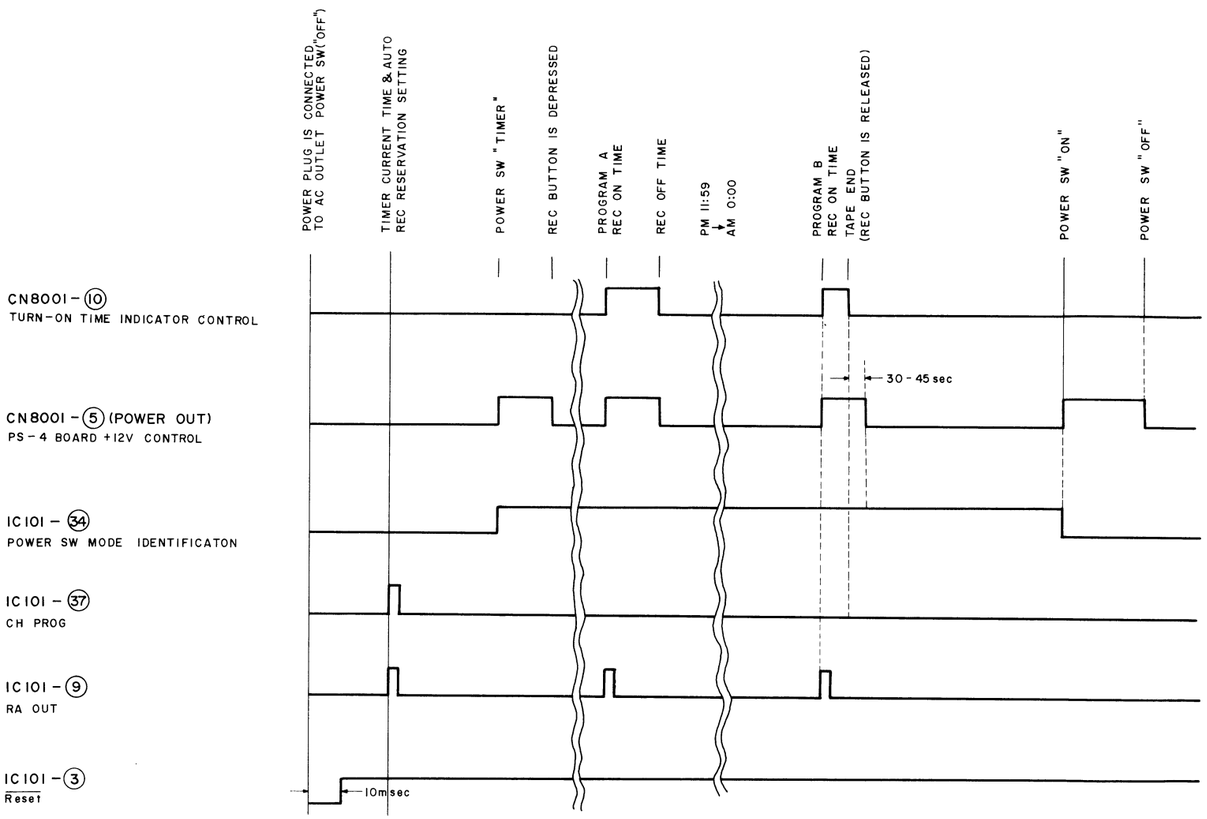
–PB MODE–

odB = 0.78Vrms
f = 333Hz





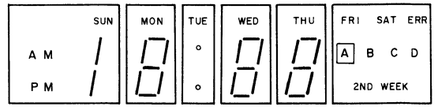
TIMER TIMING CHART



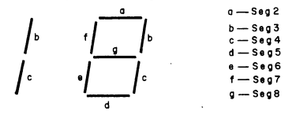
1. Relation for indication between Grid output and Segment output

Segment output \ Grid output	G1 (22)	G2 (23)	G3 (24)	G4 (25)	G5 (26)	G6 (27)
SEG 1 (13)	SUN	MON	TUE	WED	THU	FRI
SEG 2 (14)	—	a	—	a	a	SAT
SEG 3 (15)	b	b	COLON (LOWER)	b	b	ERROR
SEG 4 (16)	c	c	COLON (UPPER)	c	c	2ND WEEK
SEG 5 (17)	—	d	—	d	d	A
SEG 6 (18)	—	e	ON-T	e	e	B
SEG 7 (19)	AM	f	OFF-T	f	f	C
SEG 8 (20)	PM	g	—	g	g	D

2. Display Tube Grid

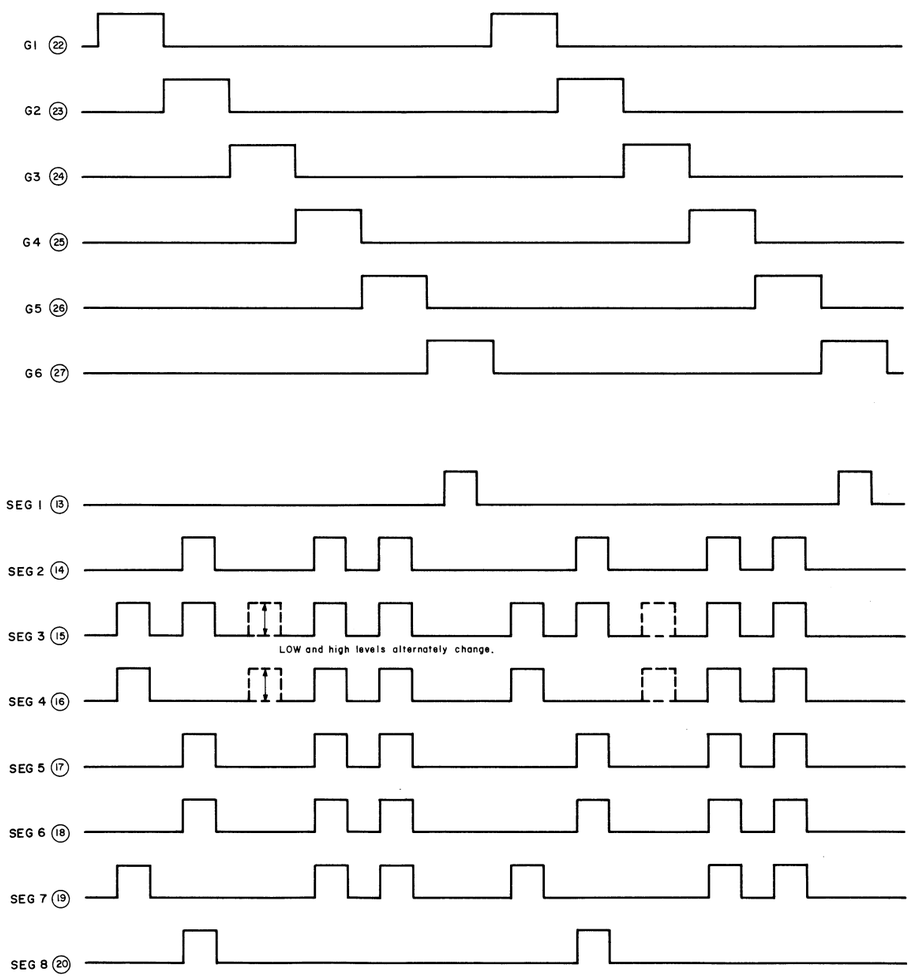


3. Display Tube Segment

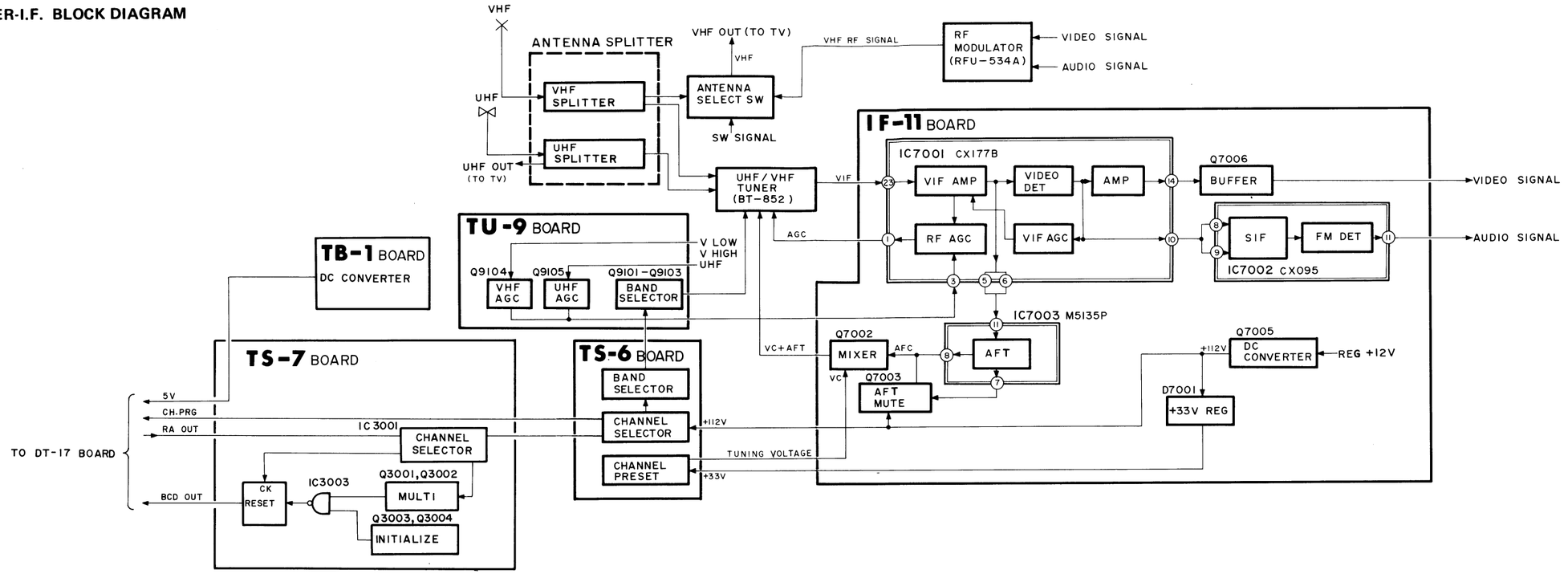


4. Timing Chart

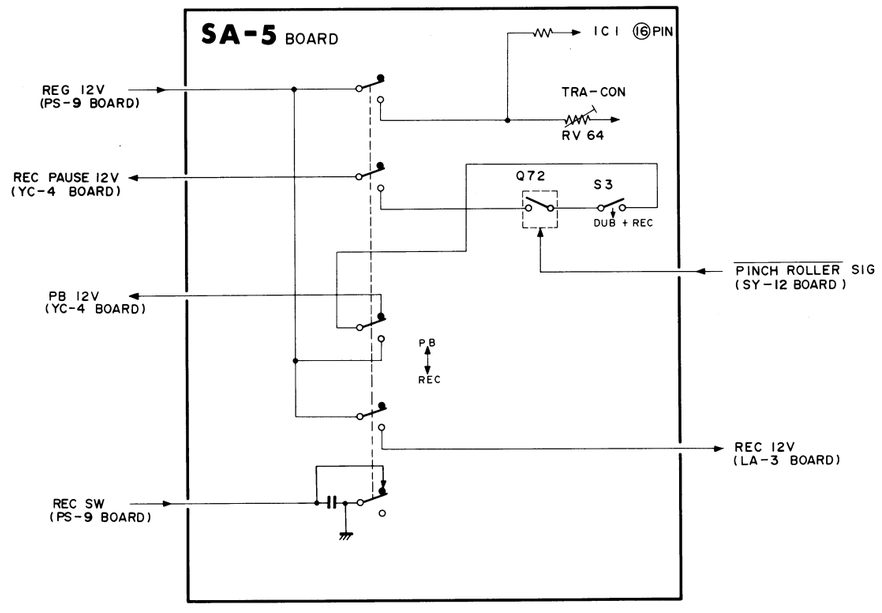
In case of "AM 12:00 FRI"



TUNER-I.F. BLOCK DIAGRAM

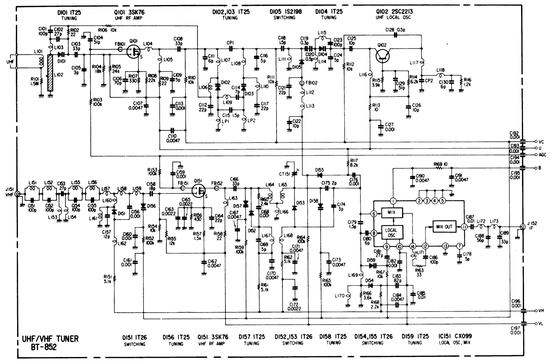


SA-5 BOARD SWITCH FOR REC/PB BLOCK DIAGRAM

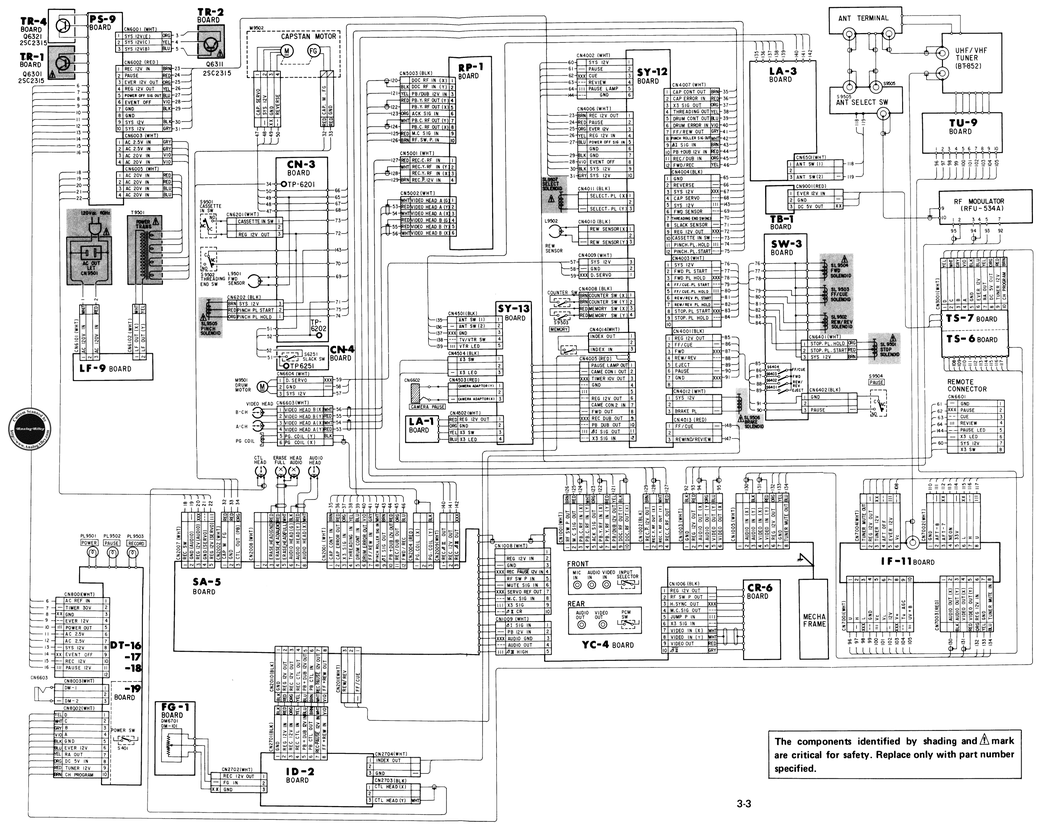


SECTION 3
PRINTED WIRING BOARD AND SCHEMATIC DIAGRAMS

TUNER SCHEMATIC DIAGRAM
– UHF/VHF TUNER BT-852 –



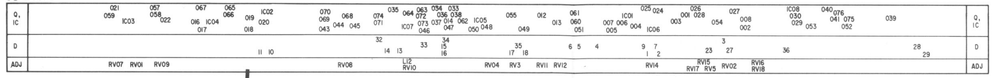
FRAME SCHEMATIC DIAGRAM
– Ref. No. CHASSIS: 9,500 Series –

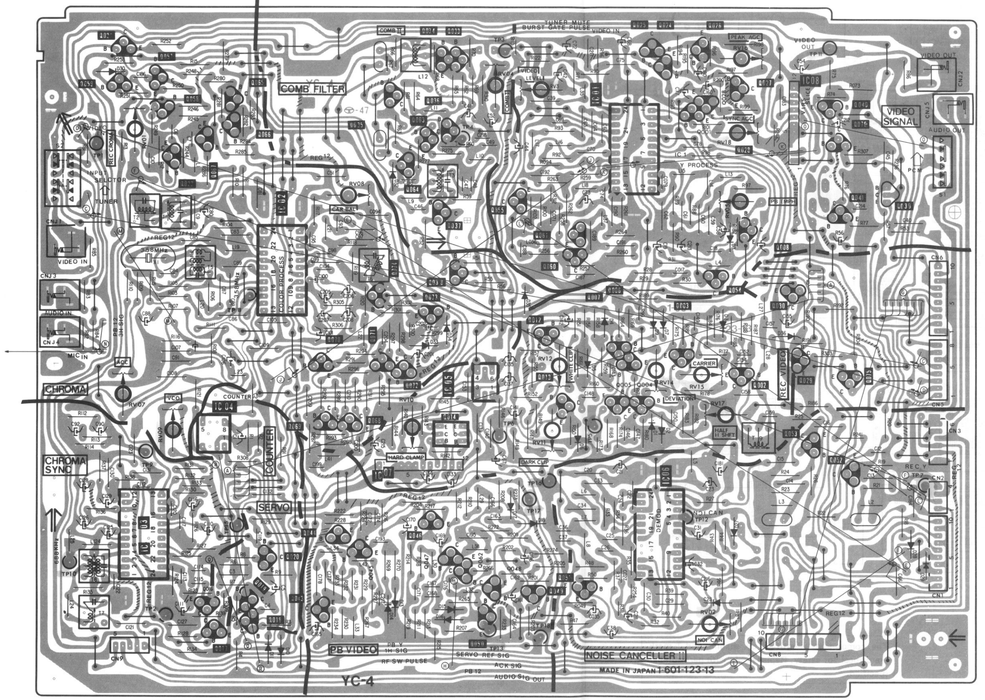


The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

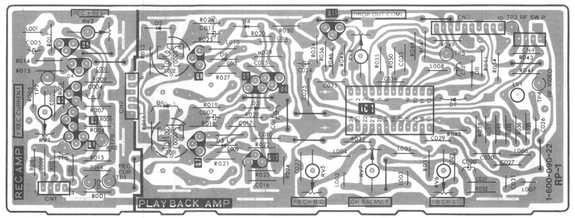
YC-4 (Y & CHROMA SIGNALS RECORD/PLAYBACK PROCESS), CR-6 (BETASCAN – CUE/REVIEW –), RP-1 (RF RECORD/PLAYBACK AMPLIFIER) PRINTED WIRING BOARDS
– Ref. No. YC-4 Board: 1000 Series, CR-6 Board: 1400 Series, RP-1 Board: 5000 Series –

YC-4 BOARD

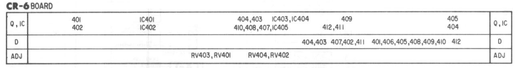


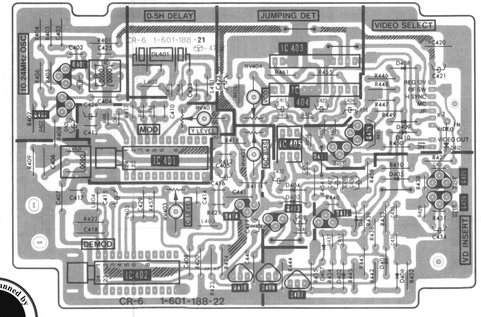


RP-1 BOARD



CR-6 BOARD





Custom Scanned by AnalogAlley
http://www.AnalogAlley.com

VIDEO SL-5600 SL-5600 VIDEO

M5478P

2SA733

2SA844

2SC403C

2SC945
2SC1815

2SC1364

2SC1963

2SK152

1S1555

BX358

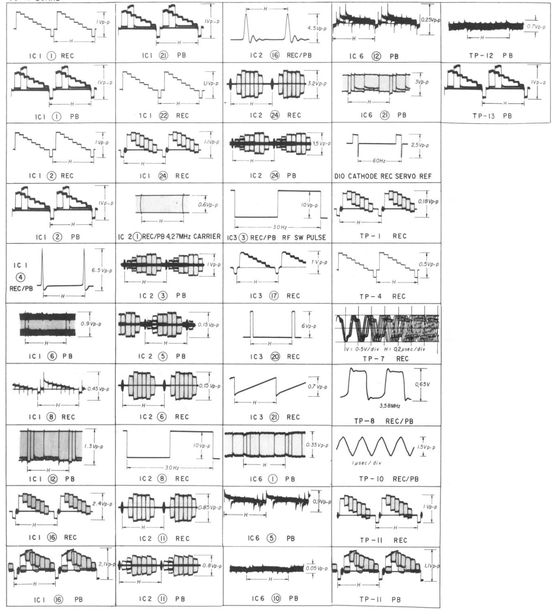
BX360
BX361

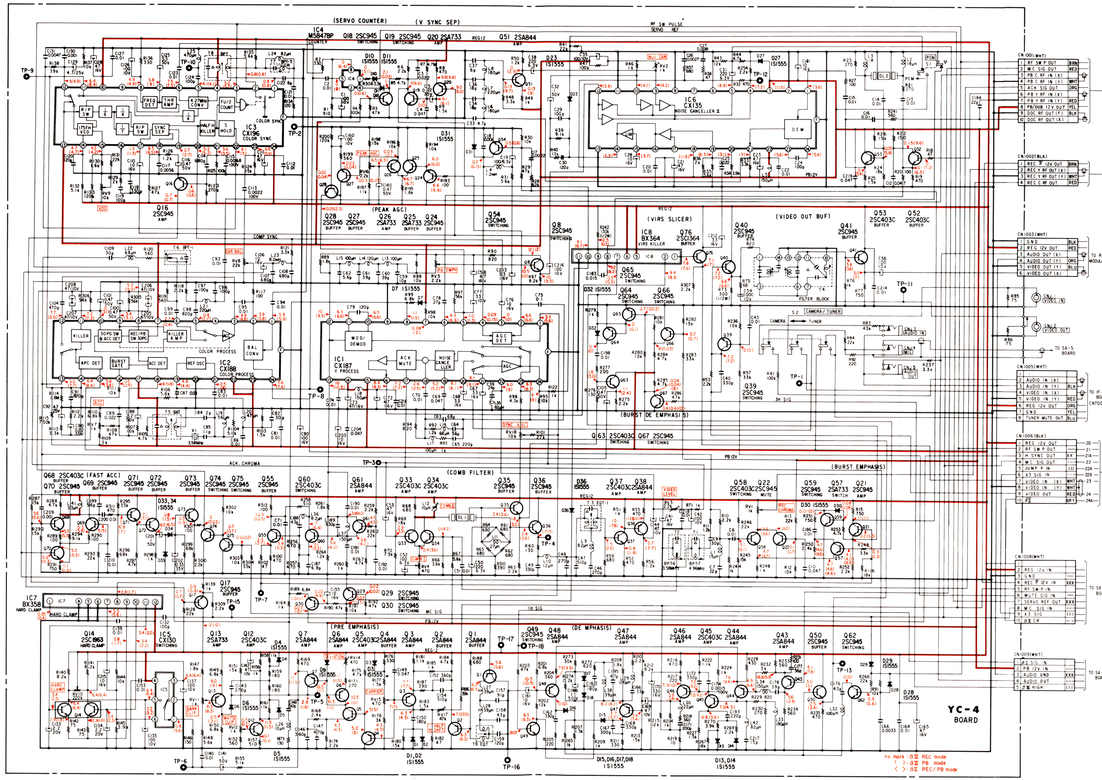
BX364

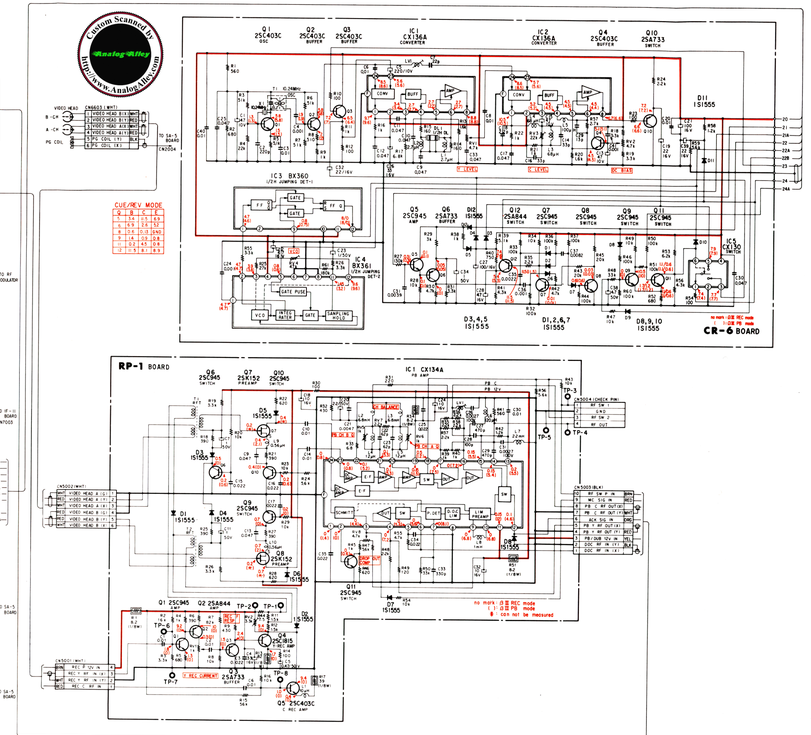
CX130

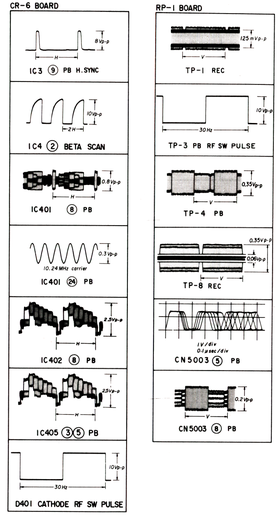
CX134A
CX135
CX136A
CX187
CX188
CX196

YC-4 BOARD









NOTES:

- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭▭ ; nonflammable resistor.
- The red lines show the main voltages.

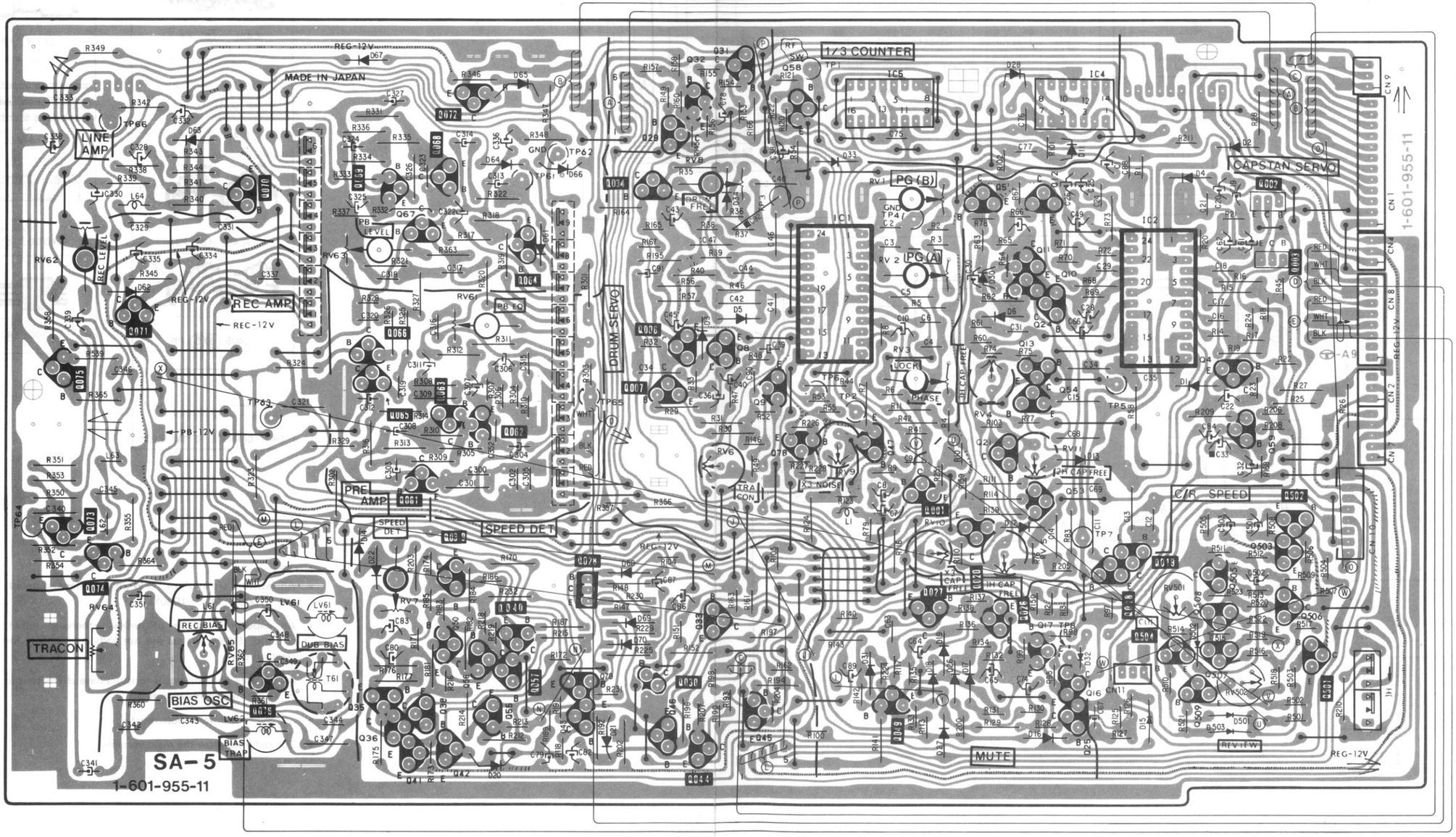
Custom Scanned by Analog Alley http://www.AnalogAlley.com

SA-5 (SERVO, AUDIO RECORD/PLAYBACK PROCESS), ID-2 (AUTOMATIC PROGRAM SEARCH, CTL AMPLIFIER), FG-1 (CAPSTAN FLY FG) PRINTED WIRING BOARDS

– Ref. No. SA-5 Board: 2000 Series, ID-2 Board: 2700 Series, FG-1 Board: 6700 Series –

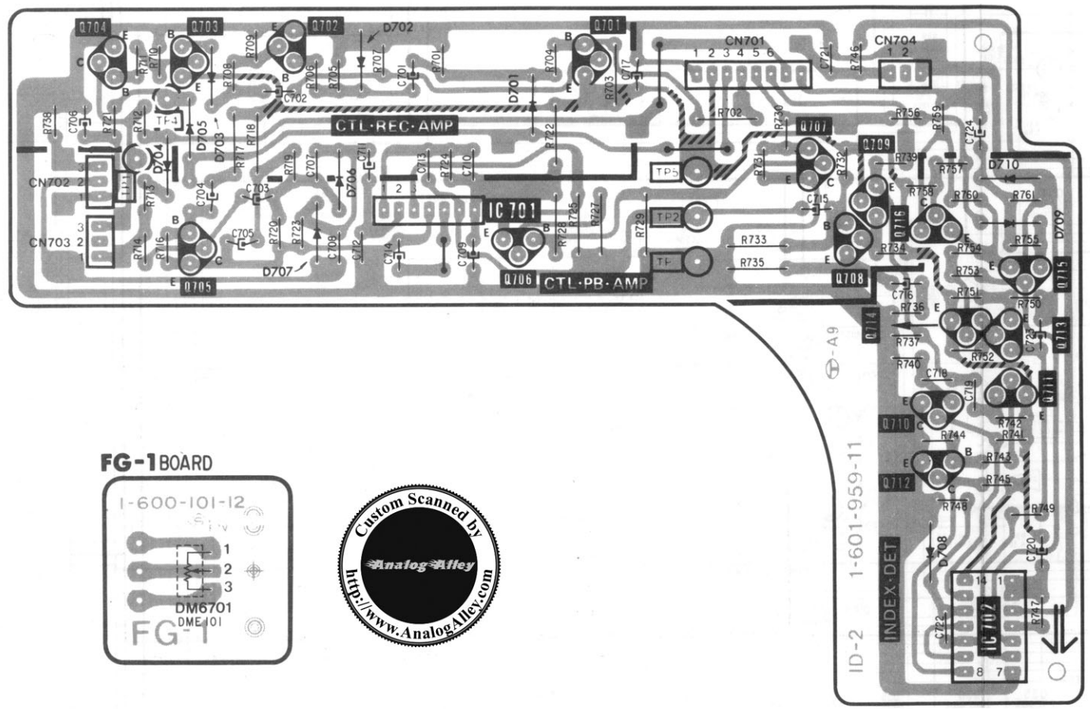
SA-5 BOARD

Q, IC	69 68 72 29 32 31 58 IC 5 5 12 IC 4 2 3 70 66 67 64 34 IC 1 11 IC 2 4 59 71 65 61 63 62 6 8 10 24 503 502 75 35 39 40 28 7 9 13 54 508 505 506 73 36 38 50 56 57 79 30 33 78 47 1 20 21 53 18 19 504 507 501 74 76 41 42 55 43 46 44 45 49 27 26 17 16 25 509	Q, IC
D	63 67 65 34 33 28 11 4 2 62 64 61 66 68 3 5 19 30 6 12 13 1 14 22 20 21 70 69 31 18 27 26 17 16 32 15 502 501 503	D
ADJ	RV62 RV63 RV8 RV1 RV61 RV6 RV9 RV2 RV65 RV7 RV3 RV4 RV11 RV64 CV62 CV61 RV10 RV5 RV501 RV502	ADJ



ID-2 BOARD

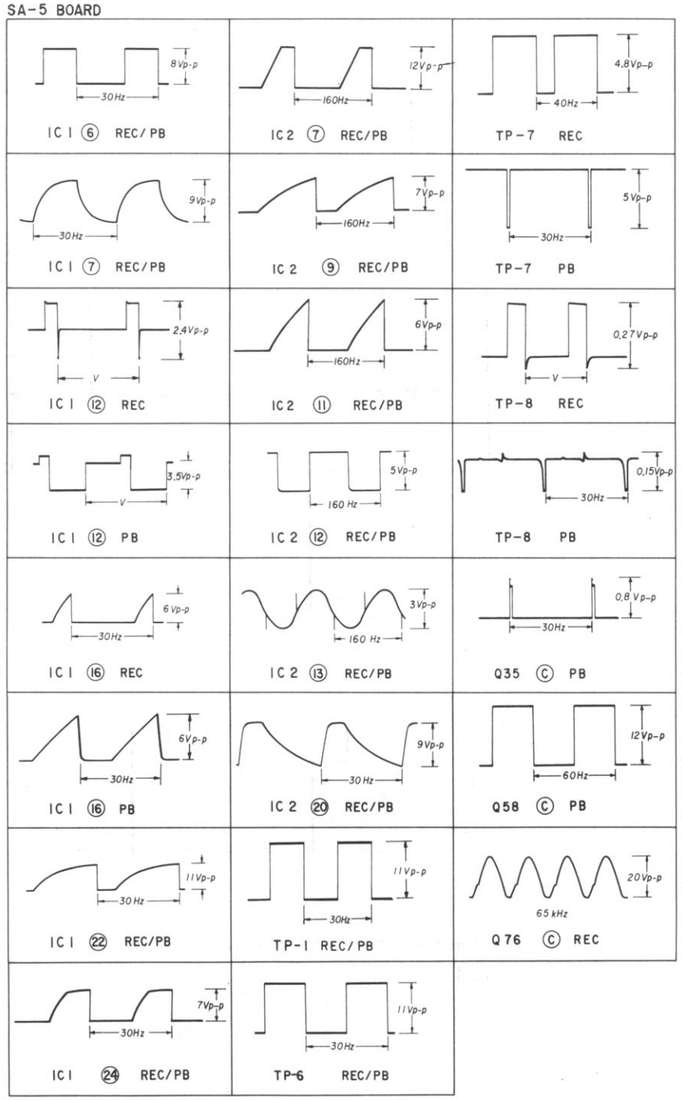
Q, IC	704 703 702 701 716 715 707 714 713 709 710 711 705 IC701 706 708 712 IC702	Q, IC
D	703 702 701 710 705 706 709 704 707 708	D



FG-1 BOARD

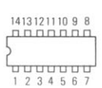
Custom Scanned by Analog Alley http://www.AnalogAlley.com

SA-5 BOARD

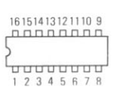


TA7120P

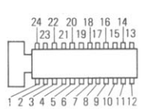
TC4011BP



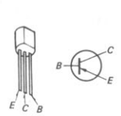
TC4027BP



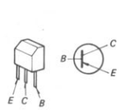
CX143A
CX186



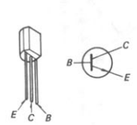
2SA733



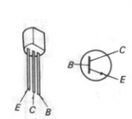
2SB733



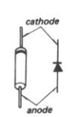
2SC945



2SC1362
2SC1364
2SC1475



1S1555
1S1587
RD6.2EB
RD13EB



SA-5 (SERVO, AUDIO RECORD/PLAYBACK PROCESS), ID-2 (AUTOMATIC PROGRAM SEARCH, CTL AMPLIFIER), FG-1 (CAPSTAN FLY FG) BOARDS SCHEMATIC DIAGRAM

– Ref. No. SA-5 Board: 2000 Series, ID-2 Board: 2700 Series, FG-1 Board: 6700 Series –

SERVO, AUDIO SL-5600 SL-5600 SERVO, AUDIO

⚠ REC MODE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC1																				
IC2																				
IC3																				
IC4																				

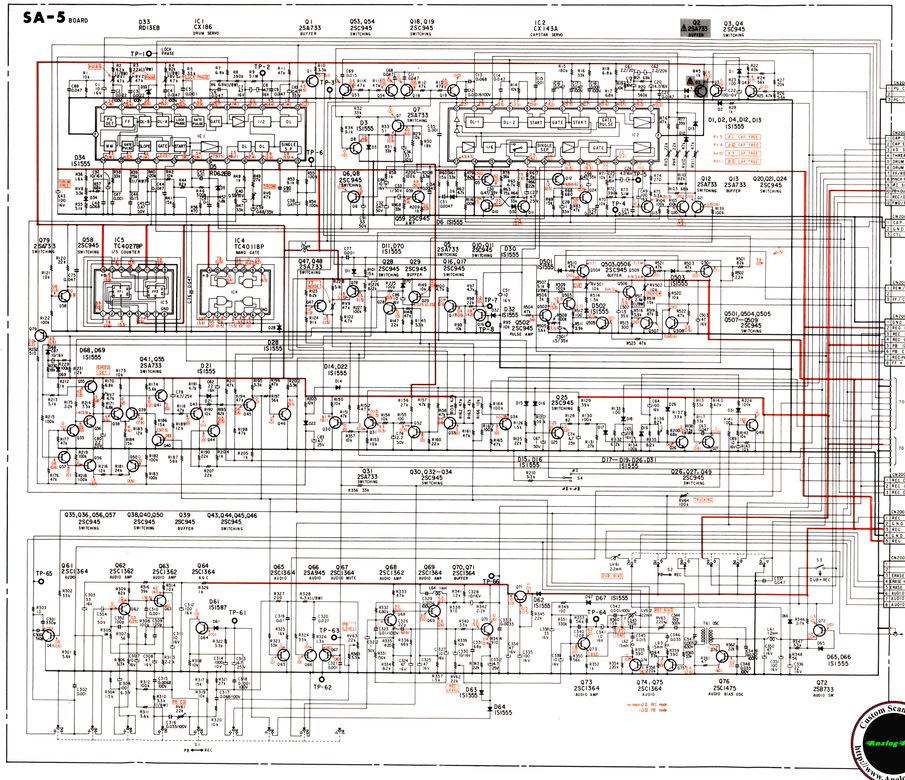
⚠ X3 MODE

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
IC1																				
IC2																				
IC3																				
IC4																				

IC																				
PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOLTAGE	6.4	0	1.4	0	2.5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0
PIN	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
VOLTAGE	5.6	0	2.5	0	5.1	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0

IC2																				
PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOLTAGE	6.4	0	1.4	0	2.5	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0
PIN	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
VOLTAGE	5.6	0	2.5	0	5.1	0	5	0	5	0	5	0	5	0	5	0	5	0	5	0

IC4																				
PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VOLTAGE	5.1	5.1	5.1	5.1	5	0	GND	5.6	5.6	0	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1



Schematics Scanned by Analog-Rifle http://www.Analog-Rifle.com

NOTES:

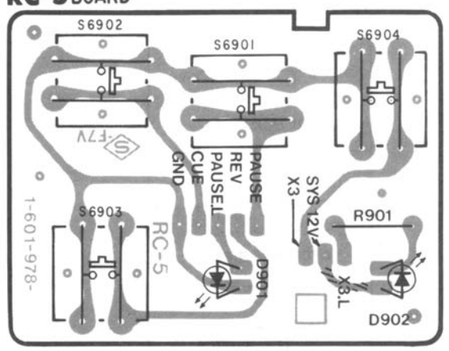
- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted, p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⚠ : nonflammable resistor.
- The red lines show the main voltages.

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

SY-13, SY-12 (SYSTEM CONTROL), RC-5 (BETASCAN), LA-1, LA-3 (LAMP, SWITCH), CN-3 (RELAY), CN-4 (SLACK SENSOR) SW-3 (SWITCH, RELAY) PRINTED WIRING BOARDS

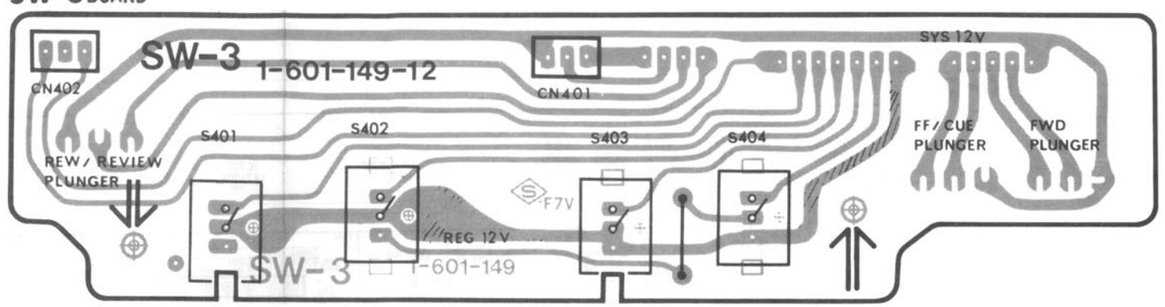
– Ref. No. SY-13 Board: 4500 Series, SY-12 Board: 4000 Series, RC-5 Board: 6900 Series, LA-1 Board: 4500 Series, LA-3 Board: 6500 Series, CN-3, CN-4 Board: 6200 Series, SW-3 Board: 6400 Series –

RC-5 BOARD



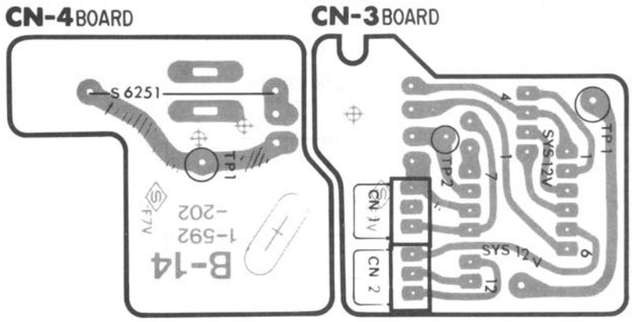
Custom Scanned by Analog Alley http://www.AnalogAlley.com

SW-3 BOARD

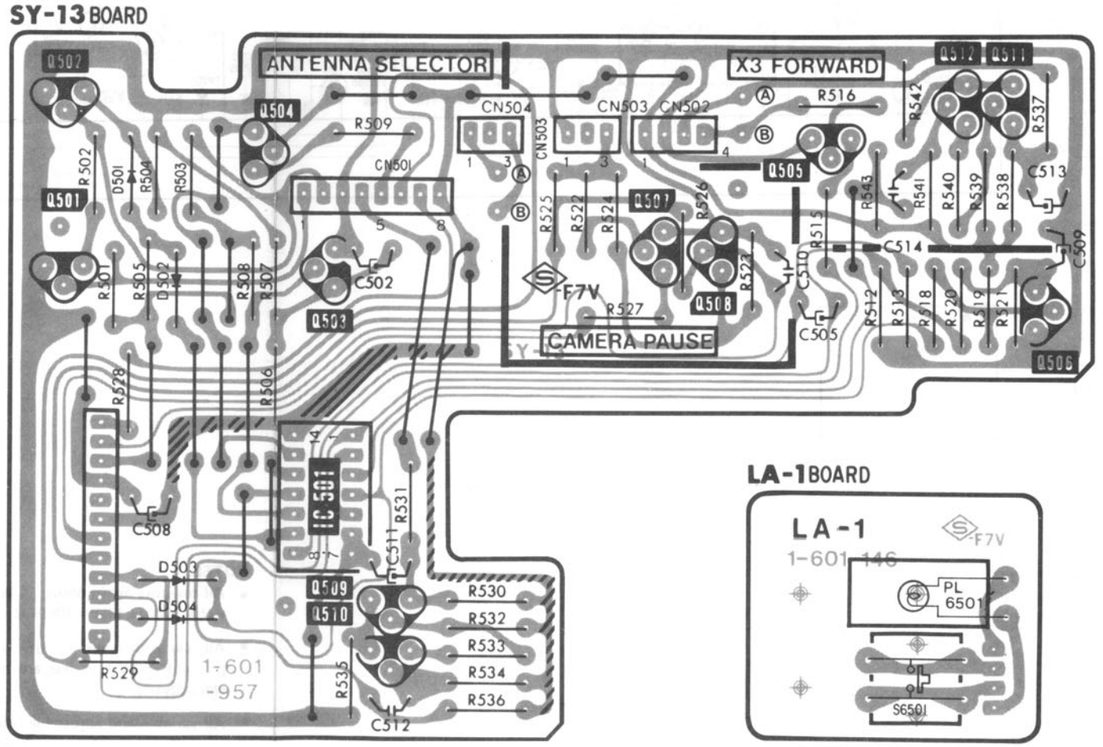


CN-4 BOARD

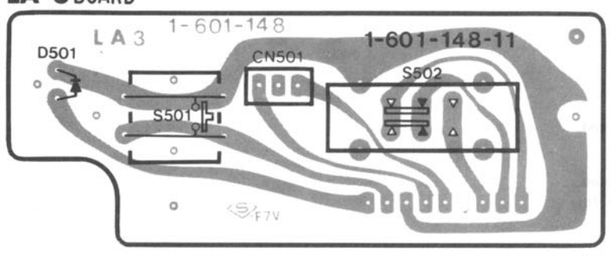
CN-3 BOARD



SY-13 BOARD



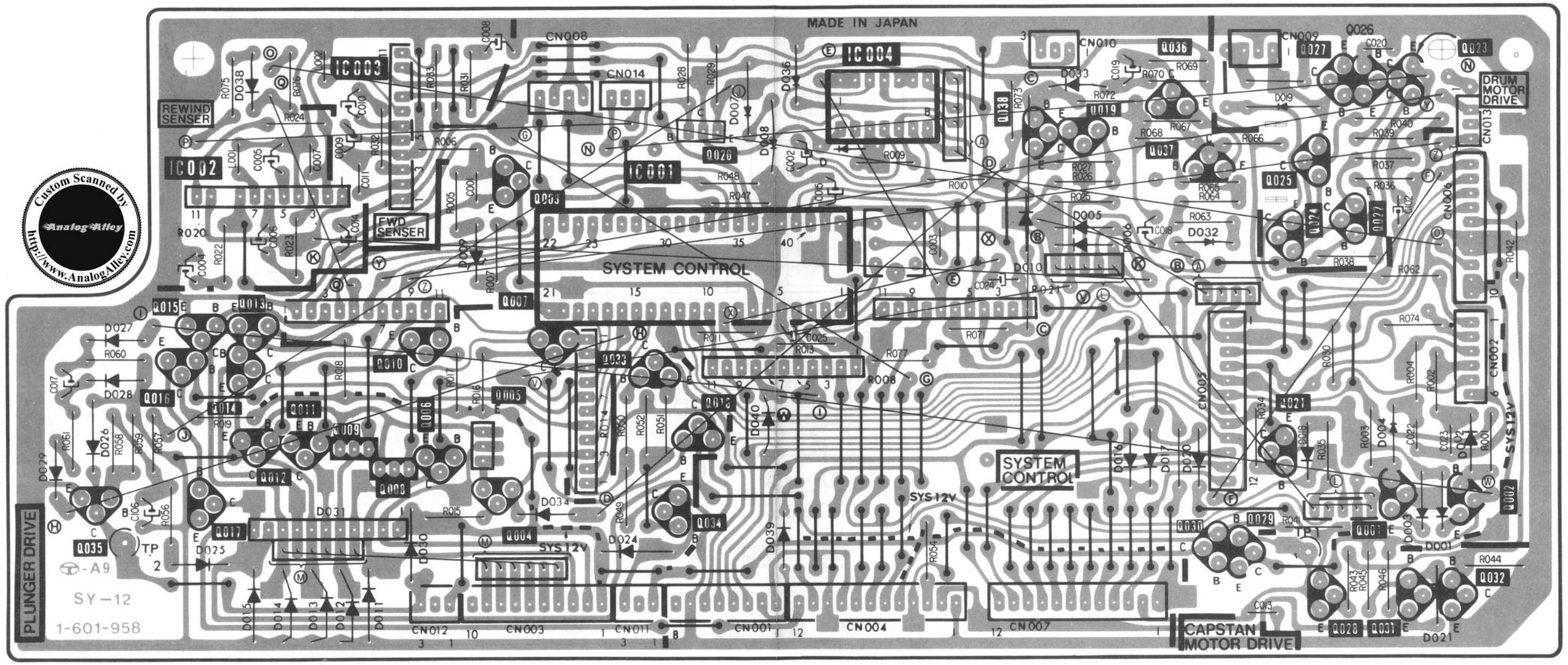
LA-3 BOARD



LA-1 BOARD

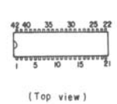
SY-12 BOARD

Q,IC	IC002,015 013 016 014 035 017 012 011 009,008 IC003 010 006 003 007 004 IC001 020 033 018 034 IC004 038 019 036 037 030 025 027 026 023 021 024 022 001 002 029 028 031 032	Q,IC
D	027,028 029,026 038 025 015 014 013 012 030 011 009 034 024 007,008,036 040,039 033 005 010 006 032 016,017,020 018,019 004 002 003,021,001	D

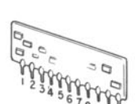


Custom Scanned by Analog Alley http://www.AnalogAlley.com

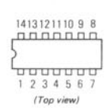
μPD546C



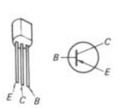
BX342



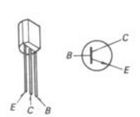
TC4001BP
TC4013BP



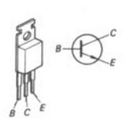
2SA733



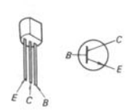
2SC945



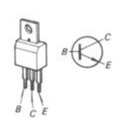
2SC1061



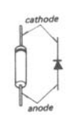
2SC1364
2SC1474



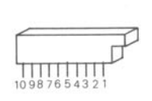
2SC1761



1S1555
1S2473
10E1
RD7.5E
RD13E

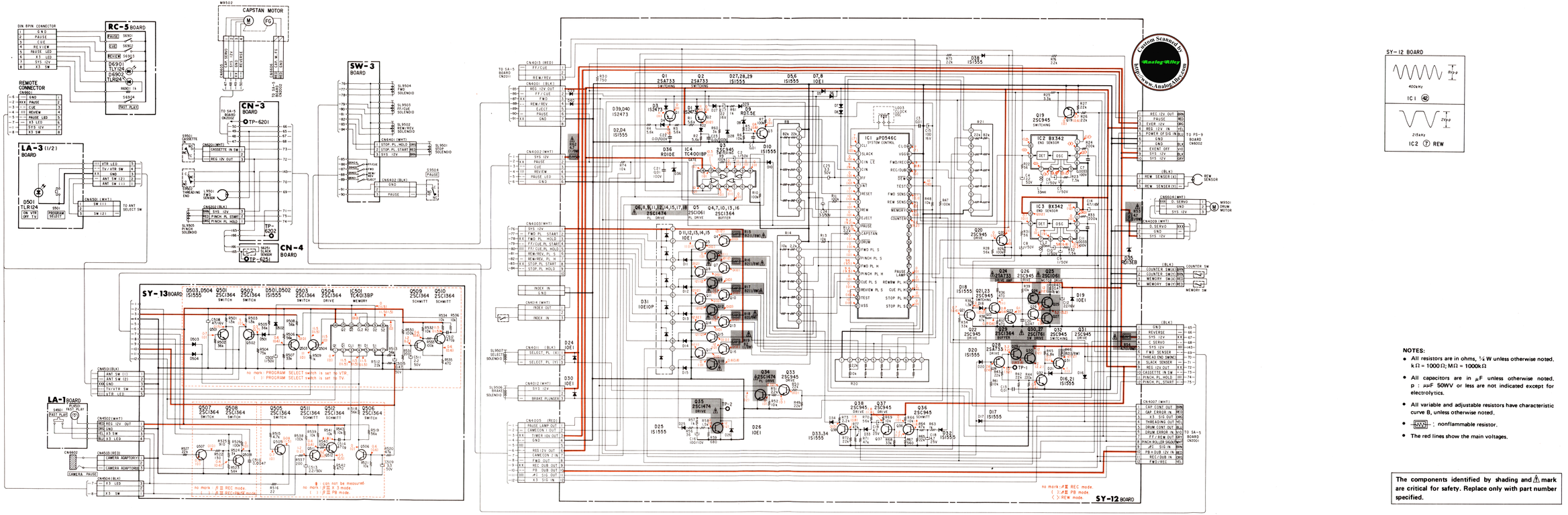


10E10P



SY-13, SY-12 (SYSTEM CONTROL), RC-5 (BETASCAN), LA-1, LA-3 (LAMP, SWITCH), CN-3 (RELAY), CN-4 (SLACK SENSOR) SW-3 (SWITCH, RELAY) BOARDS SCHEMATIC DIAGRAM

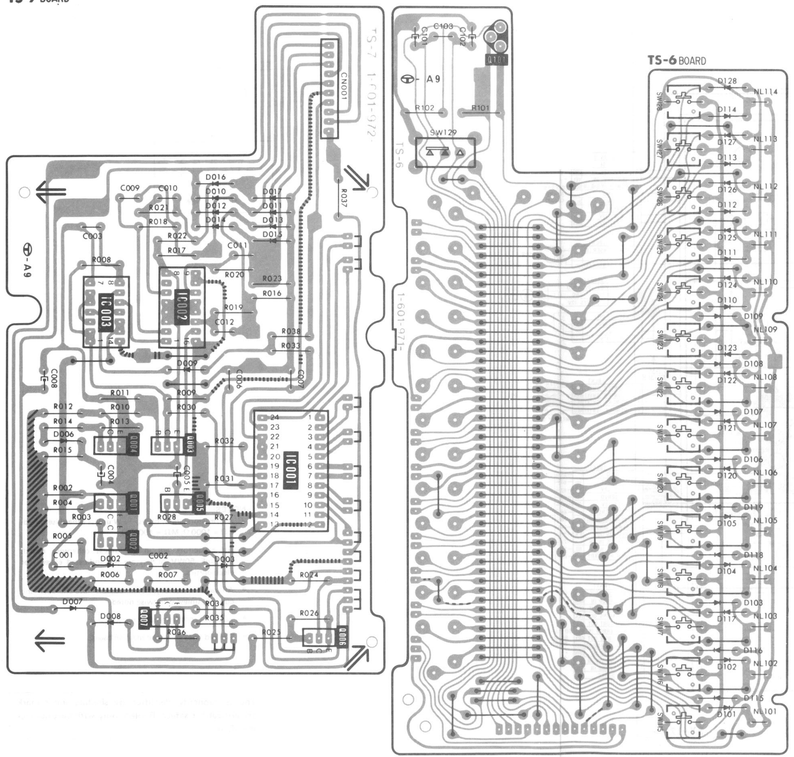
– Ref. No. SY-13 Board: 4500 Series, SY-12 Board: 4000 Series, RC-5 Board: 6900 Series, LA-1 Board: 4500 Series, LA-3 Board: 6500 Series, CN-3, CN-4 Board: 6200 Series, SW-3 Board: 6400 Series –


RC-5 BOARD
SW-3 BOARD
CN-3 BOARD
CN-4 BOARD
LA-3 (1/2) BOARD
LA-1 BOARD
SY-13 BOARD
SY-12 BOARD
CAPSTAN MOTOR
REMOTE CONNECTOR
IC1 μPD546C SYSTEM CONTROL
IC2 BX342 END SENSOR
IC3 BX342 END SENSOR
IC4 TC4001BP
IC501 TC4013BP
REW SENSOR
DRUM MOTOR
Custom Scanned By
Analog4ltg
http://www.Analog4ltg.com
SY-12 BOARD
400kHz
IC1 ㊷
IC2 ⑦ REW
NOTES:
All resistors are in ohms, ¼ W unless otherwise noted. k Ω = 1000 Ω; M Ω = 1000k Ω
All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
: nonflammable resistor.
The red lines show the main voltages.
The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

IF-11 (VIF, SIF, AFT), TU-9 (TUNER AGC, BAND SELECTOR), TB-1 (DC CONVERTER), TS-6 (CHANNEL PRESET, CHANNEL SELECT), TS-7 (AUTO PROGRAM SEARCH) PRINTED WIRING BOARDS

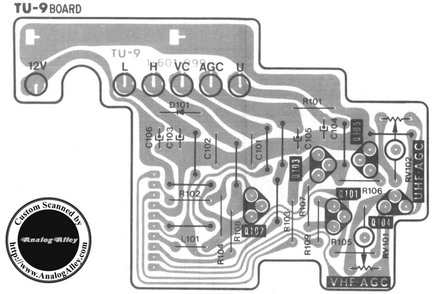
– Ref. No. IF-11 Board: 7000 Series, TU-9 Board: 9100 Series, TB-1 Board: 9000 Series, TS-6 Board 3100 Series, TS-7 Board: 3000 Series –

TS-7 BOARD

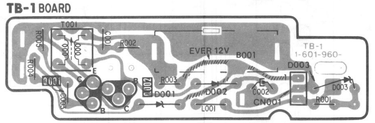


TS-6 BOARD

TU-9 BOARD



TB-1 BOARD

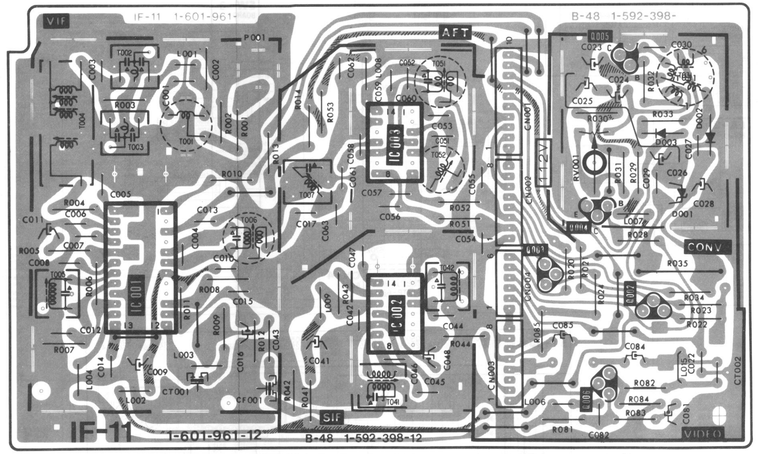


Custom Scanned by Analog Alley
http://www.AnalogAlley.com

TUNER SL-5600 SL-5600 TUNER

IF-11 BOARD

Q, IC	IC001	IC003 IC002	003	004 006 005 002	Q, IC
D				003, 001, 002	D
ADJ				RV001	ADJ

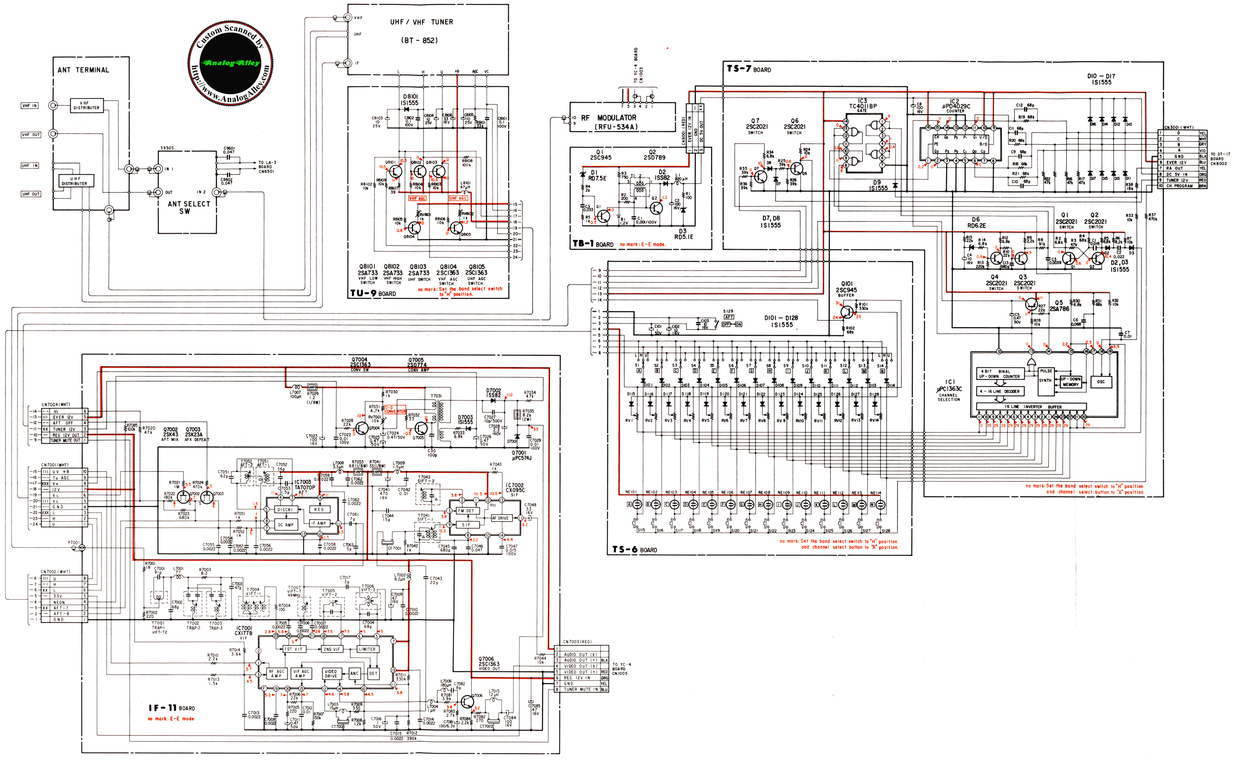


MB8841 | TC4001BP TC4081BP | μPA54H | μPA56C | μPC78L05 | 2SA786 | 2SC945 | 2SC2021 | 2SC2315 | 2SD789 | 1S1555 10E2 RD3.9E RD5.1EC RD6.2E RD13E | DS5BN | M4B41 | TLR124

IF-11 (VIF, SIF, AFT), TU-9 (TUNER AGC, BAND SELECTOR), TB-1 (DC CONVERTER), TS-6 (CHANNEL PRESET, CHANNEL SELECT), TS-7 (AUTO PROGRAM SEARCH) BOARDS SCHEMATIC DIAGRAM

– Ref. No. IF-11 Board: 7000 Series, TU-9 Board: 9100 Series, TB-1 Board: 9000 Series, TS-6 Board 3100 Series, TS-7 Board: 3000 Series –

Custom Scanned By Analog-Alley Hippy Dave Analog Electronics


ANT TERMINAL
UHF / VHF TUNER (BT-852)
ANT SELECT SW
RF MODULATOR (RFU-534A)
TU-9 BOARD
TB-1 BOARD
TS-7 BOARD
TS-6 BOARD
IF-11 BOARD
no mark: E-E mode
no mark: Set the band select switch to "H" position.
no mark: Set the band select switch to "H" position and channel select button to "A" position.
no mark: Set the band select switch to "H" position and channel select button to "A" position.

NOTES:

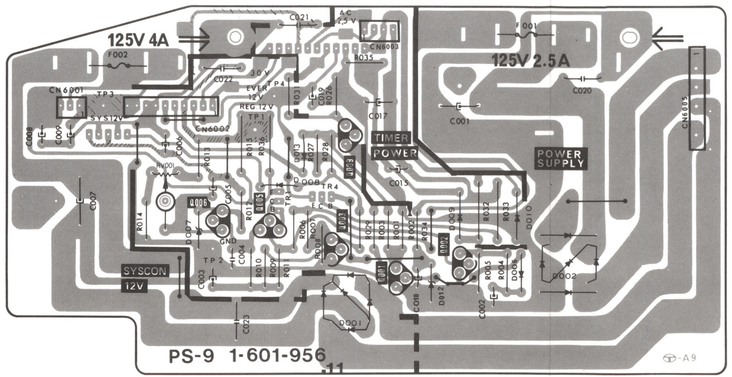
- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : nonflammable resistor.
- The red lines show the main voltages.

PS-9 (POWER SUPPLY), TR-1, TR-2 AND TR-4 (POWER TRANSISTOR), LF-9 (LINE FILTER), DT-15, DT-16, DT-17, DT-18 AND DT-19 (PROGRAM TIMER) PRINTED WIRING BOARDS

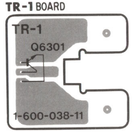
– Ref. No. PS-9 Board: 6000 Series, TR-1, TR-2 and TR-4 Board: 6300 Series, LF-9 Board: 6,100 Series, ST-15, DT-16, DT-17, DT-18 and DT-19 Board: 8,000 Series –

PS-9 BOARD

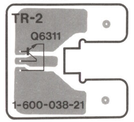
Q , IC	006 005 003,009 001 002	Q , IC
D	007 008 013 001 012 009 010,006 002	D
ADJ	RV001	ADJ



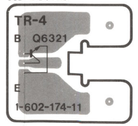
TR-1 BOARD



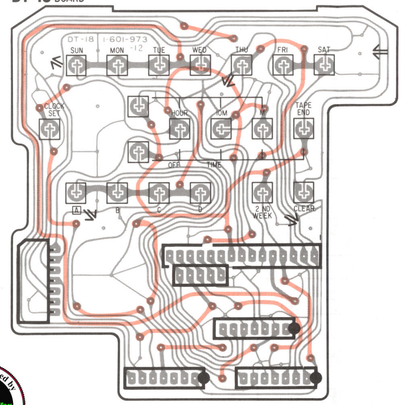
TR-2 BOARD



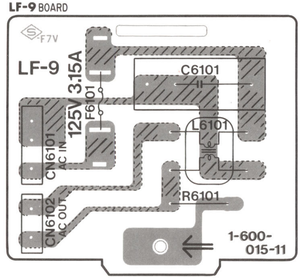
TR-4 BOARD



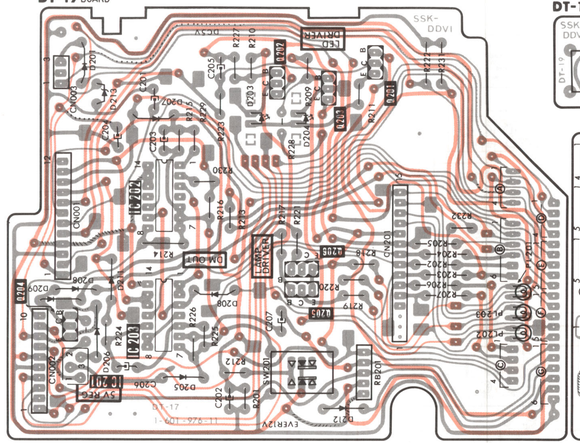
DT-18 BOARD



LF-9 BOARD

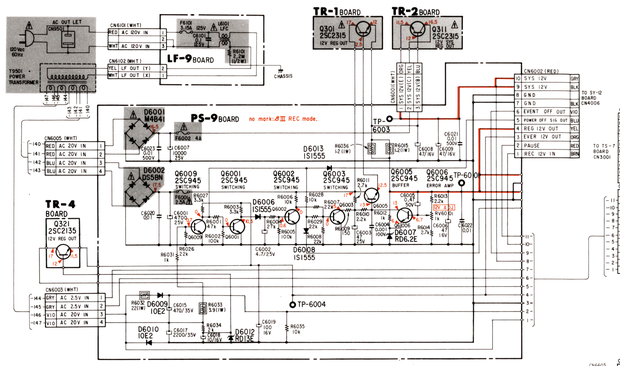


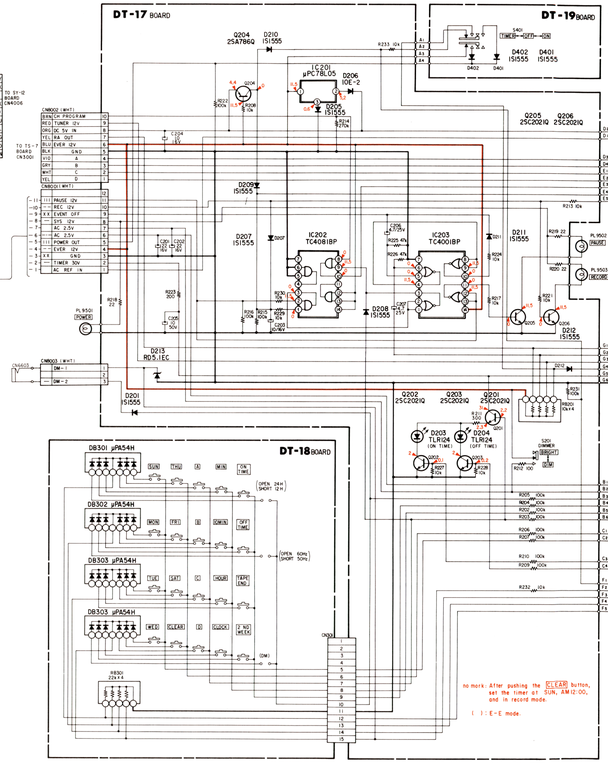
DT-17 BOARD

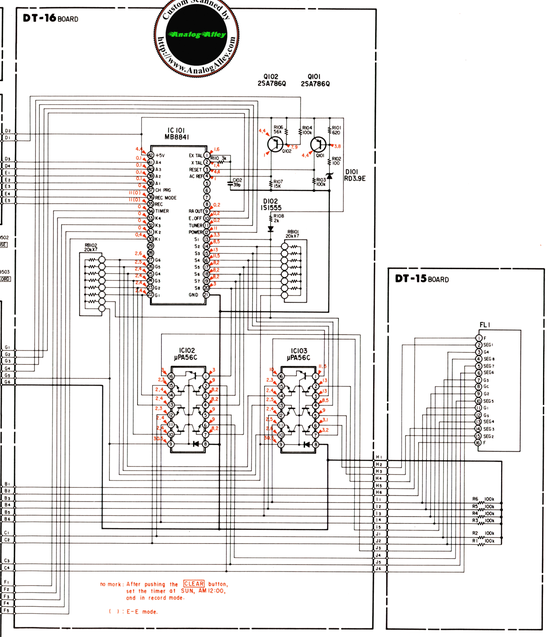


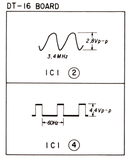
PS-9 (POWER SUPPLY), TR-1, TR-2 AND TR-4 (POWER TRANSISTOR), LF-9 (LINE FILTER), DT-15, DT-16, DT-17, DT-18 AND DT-19 (PROGRAM TIMER) BOARDS SCHEMATIC DIAGRAM

– Ref. No. PS-9 Board: 6000 Series, TR-1, TR-2 and TR-4 Board: 6300 Series, LF-9 Board: 6,100 Series, ST-15, DT-16, DT-17, DT-18 and DT-19 Board: 8,000 Series –






DT-16 BOARD
IC101 MB8841
IC102 μPA56C
IC103 μPA56C
no mark: After pushing the CLEAR button, set the timer at SUN, AM12:00, and in record mode.
( ): E-E mode.



NOTES:

- All resistors are in ohms, ¼ W unless otherwise noted. kΩ = 1000Ω; MΩ = 1000kΩ
- All capacitors are in μF unless otherwise noted. p : μμF 50WV or less are not indicated except for electrolytics.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⚠ : nonflammable resistor.
- The red lines show the main voltages.

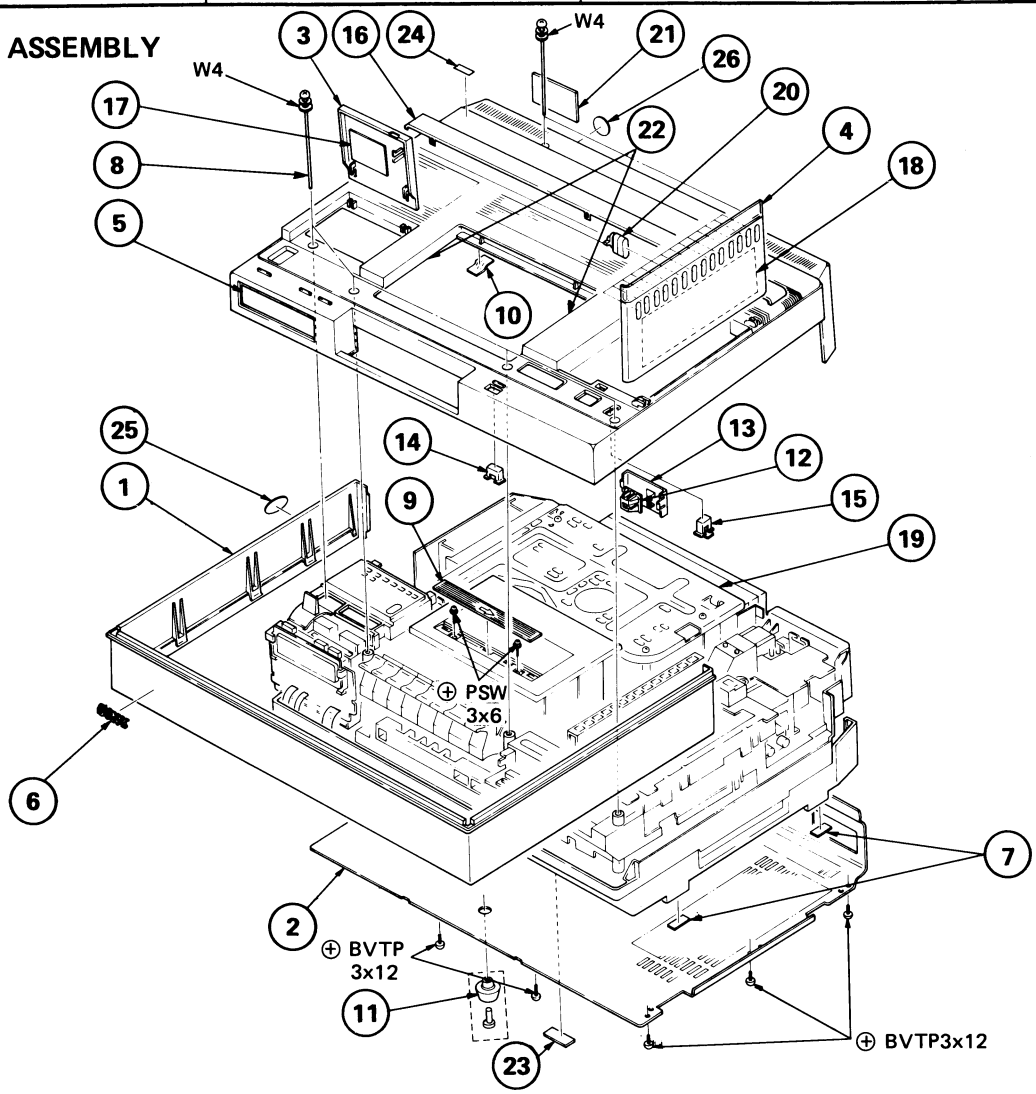
The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

SECTION 4
EXPLODED VIEWS

Note:

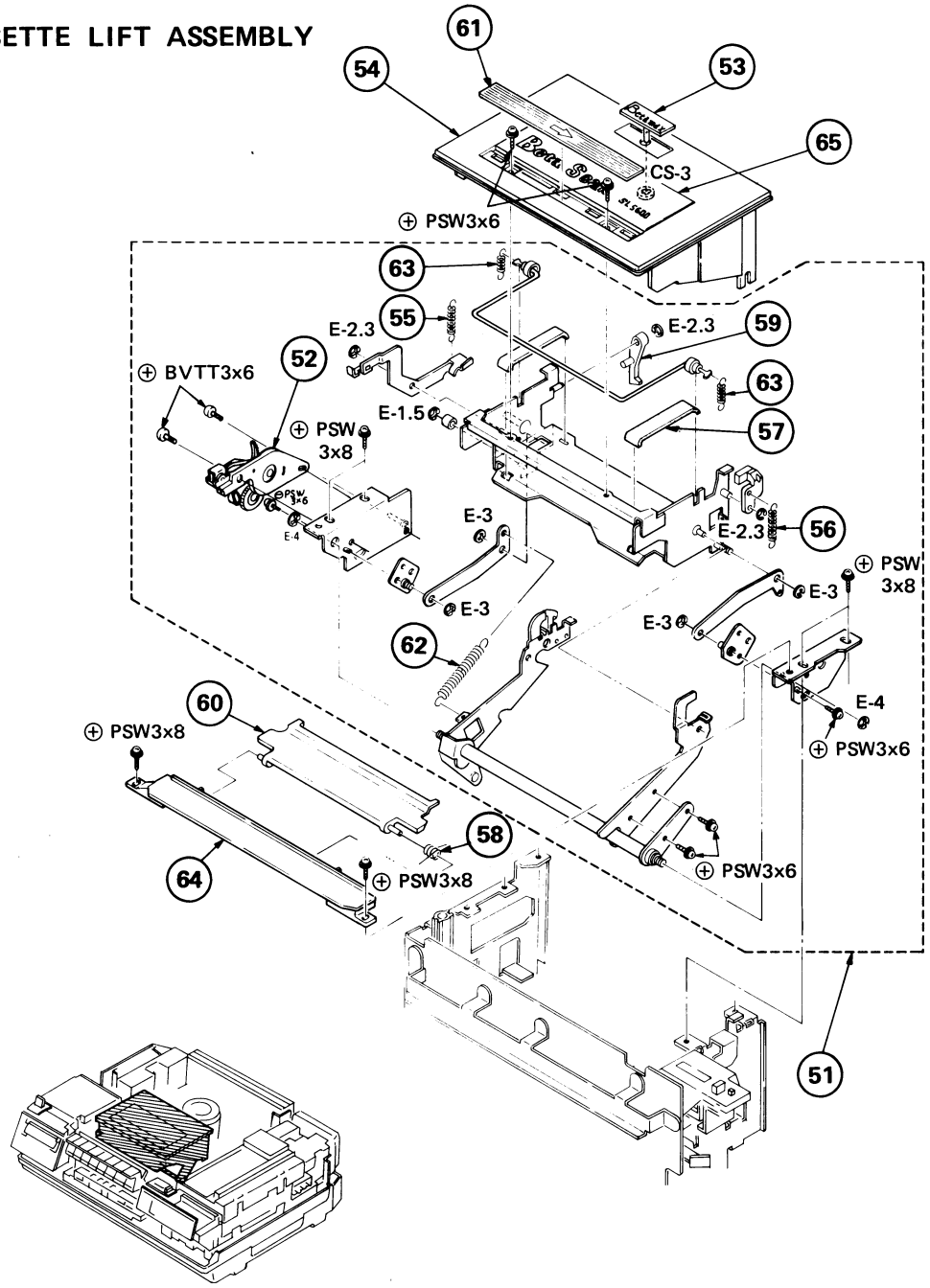
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- As to the part numbered with E-, refer to the electrical parts list.
- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

CABINET ASSEMBLY



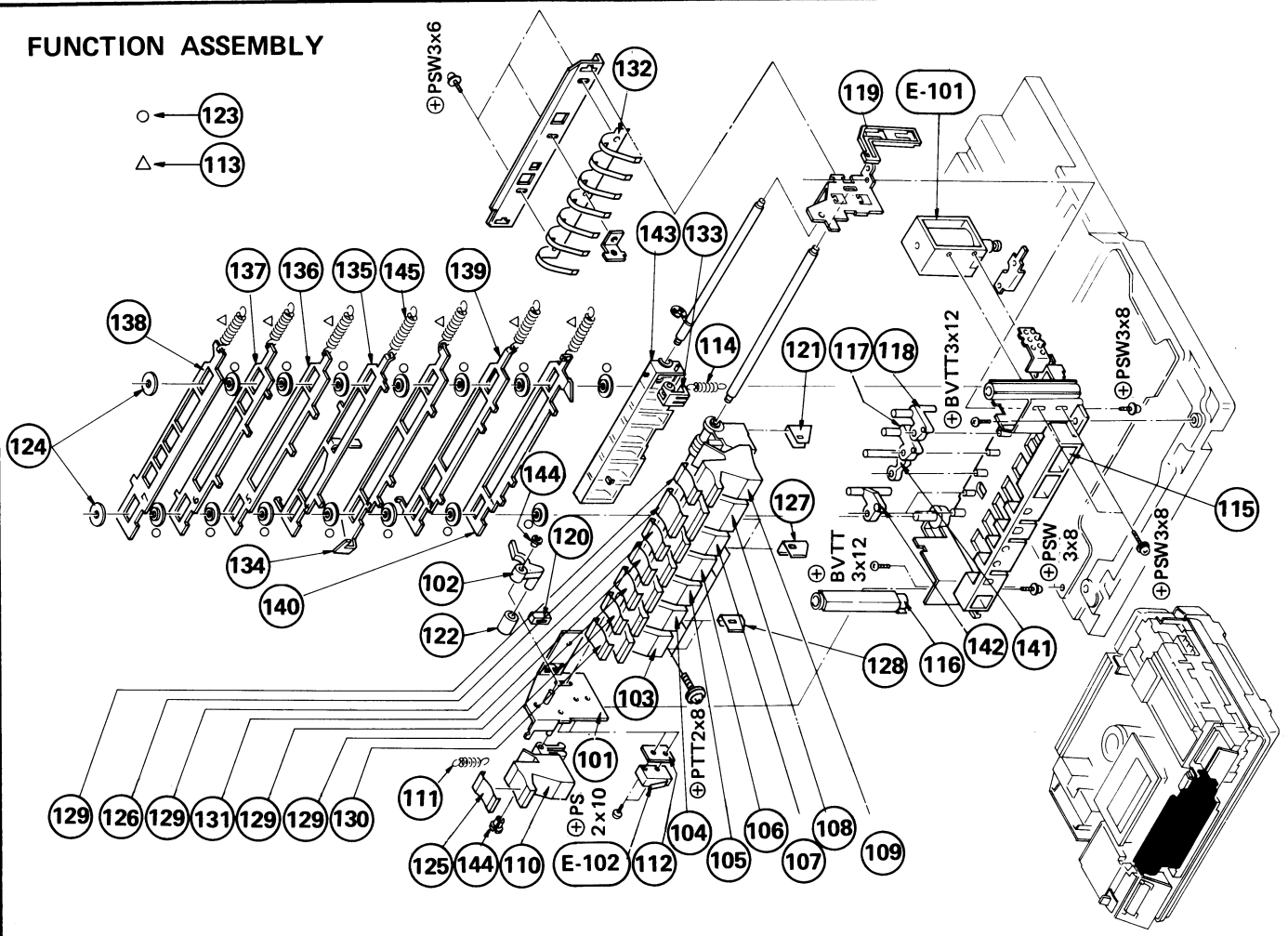
No.	Part No.	Description	Remark
1	X-3661-530-0	FRAME ASS'Y, inner	6, 25
2	X-3661-560-0	PLATE ASS'Y (W), bottom	23
3	X-3661-573-0	COVER ASS'Y, timer	17
4	X-3661-577-0	DOOR ASS'Y, tuner	18
5	X-3661-578-0	CASE ASS'Y, upper	10, 16, 22, 24
6	3-548-973-00	EMBLEM, SONY	
7	3-659-532-00	FELT, foot	
8	3-659-533-00	SCREW, cabinet	
9	3-659-585-00	STRIP, ornamental cassette	
10	3-659-748-00	CLOTH, masking; upper case	
11	3-659-768-00	FOOT	
12	3-661-544-00	HOLDER, switch	
13	3-661-612-00	COVER, switch	
14	3-661-613-00	KNOB, speed	
15	3-661-614-00	BUTTON, antenna selection	
16	♦ 3-661-650-00	BAND, ornamental	
17	3-661-704-00	LABEL, timer cover	
18	3-661-705-00	LABEL, tuner cover	
19	♦ 3-661-757-00	COVER, shield	
20	3-661-769-00	BUTTON, preset	
21	♦ 3-661-774-00	LABEL, model number	
22	3-661-785-11	CUSHION, cassette crevice	
23	3-703-043-21	LABEL, caution; main	
24	♦ 3-703-082-31	LABEL, caution	
25	♦ 3-703-184-01	LABEL, material indicating	
26	3-703-338-01	LABEL, UL	
27	4-859-909-01	SPACER, switch	

CASSETTE LIFT ASSEMBLY



No.	Part No.	Description	Remark
51	A-6751-061-A	CASSETTE-UP BLOCK ASS'Y	52, 55, 56 57, 59, 62 63
52	A-6751-079-A	DAMPER ASS'Y, rotary	
53	X-3658-101-0	EMBLEM ASS'Y (P)	
54	X-3661-581-0	LID (W) ASS'Y, cassette-up	53, 65
55	3-536-006-XX	SPRING, tension	
56	3-642-490-00	SPRING, tension	
57	3-659-498-00	CUSHION, cassette holder	
58	3-659-531-00	SPRING	
59	3-659-579-00	LEVER, release; lid lock	
60	3-659-583-00	PLATE, blind; cassette	
61	3-659-585-00	STRIP, ornamental; cassette	
62	3-659-635-00	SPRING, tension	
63	3-659-636-00	SPRING, tension	
64	3-661-681-00	GUIDE, cassette	
65	3-661-786-00	STICKER (5600)	

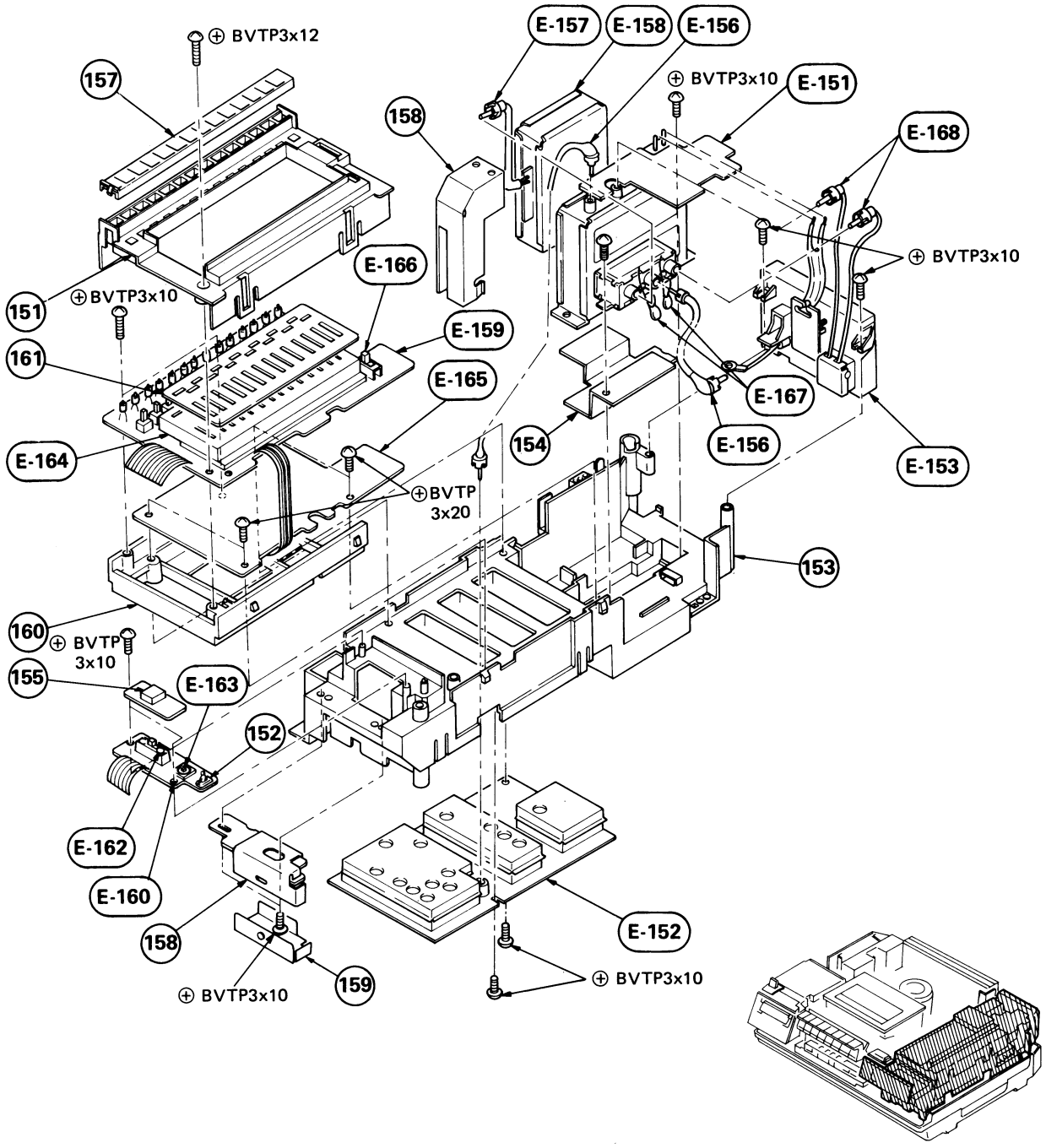
FUNCTION ASSEMBLY



No.	Part No.	Description	Remark
101	♦X-3661-517-0	PLATE ASS'Y, side; left	
102	♦X-3661-519-0	LEVER ASS'Y, release; lock plate	122
103	X-3661-534-0	BUTTON ASS'Y, EJECT	128, 130
104	X-3661-535-0	BUTTON ASS'Y, REW	128, 129
105	X-3661-536-0	BUTTON ASS'Y, STOP	129
106	X-3661-537-0	BUTTON ASS'Y, FWD	131
107	X-3661-538-0	BUTTON ASS'Y, FF	127, 129
108	X-3661-539-0	BUTTON ASS'Y, REC	126, 127
109	X-3661-540-0	BUTTON ASS'Y, DUB	121, 129
110	X-3661-541-0	BUTTON ASS'Y, PAUSE	125
111	3-143-117-00	SPRING, tension	
112	3-534-263-00	PLATE, insulating; M. SW	
113	3-536-006-XX	SPRING, tension	
114	3-630-622-00	SPRING, tension	
115	♦3-661-555-00	FRAME, lower	
116	♦3-661-575-00	SUPPORT	
117	3-661-578-02	LEVER, change; FF	
118	3-661-579-00	LEVER, change; REC	
119	♦3-661-581-00	PLATE, release	
120	♦3-661-584-00	RUBBER, silence	
121	♦3-661-585-00	PROTECTOR (1)	
122	3-661-588-00	SPACER	

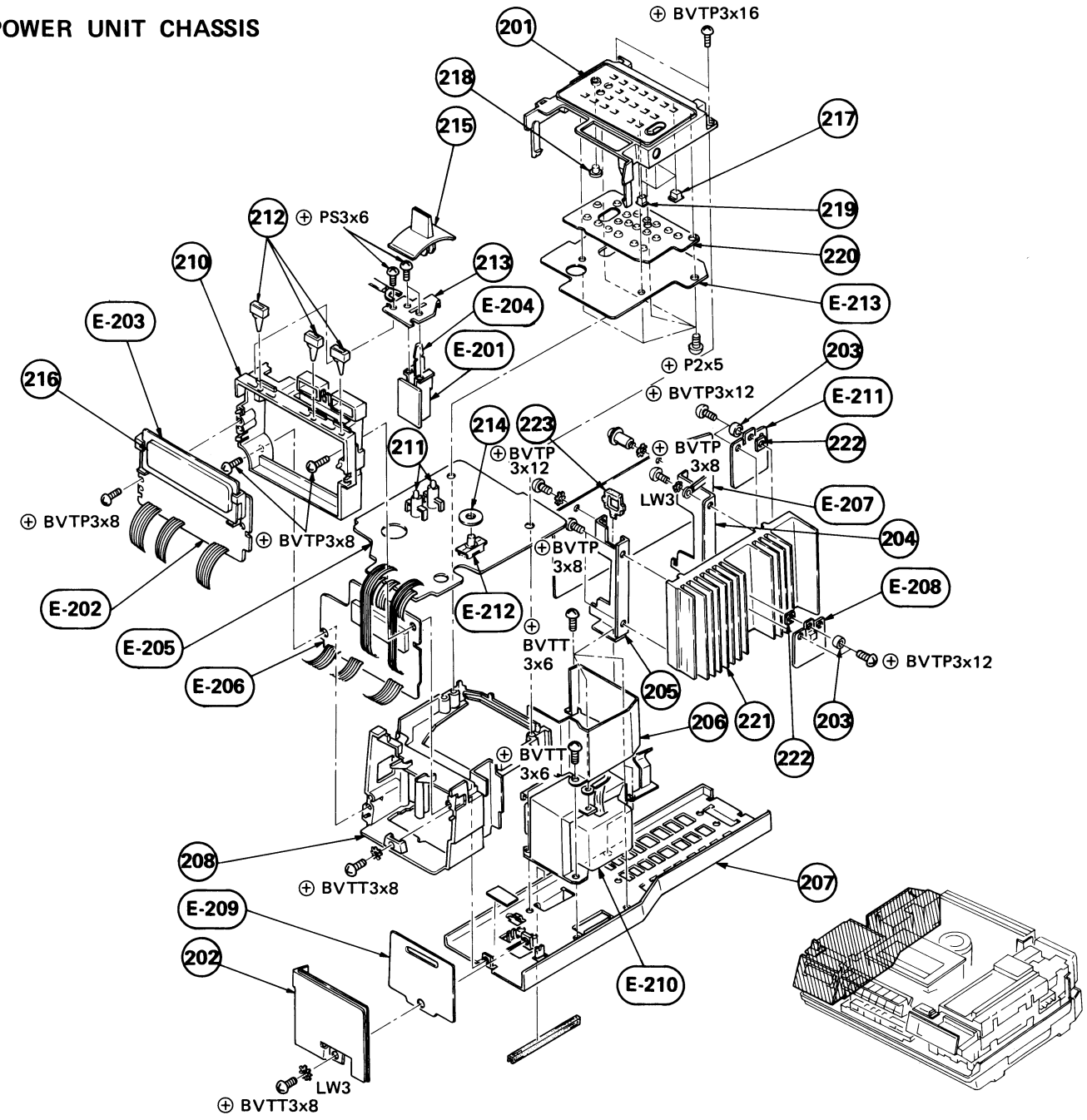
No.	Part No.	Description	Remark
123	3-661-610-00	SPACER, slide plate (6-8)	
124	3-661-611-00	POLY SLIDER (6-14)	
125	3-661-631-00	PLATE (3), ornamental	
126	3-661-632-00	PLATE (2), ornamental	
127	♦3-661-633-00	PROTECTOR (2)	
128	♦3-661-634-00	PROTECTOR (3)	
129	3-661-635-01	PLATE (1), ornamental	
130	3-661-635-11	PLATE (1), ornamental	
131	3-661-635-21	PLATE (1), ornamental	
132	3-661-636-00	SPRING	
133	♦3-661-640-00	PLATE (2), lock	
134	♦3-661-661-00	PLATE, FF	
135	♦3-661-662-00	PLATE, FWD	
136	♦3-661-663-00	PLATE, EJECT	
137	♦3-661-664-00	PLATE, REC	
138	♦3-661-665-00	PLATE, MB	
139	♦3-661-666-00	PLATE, REW	
140	♦3-661-667-00	PLATE, DUB	
141	3-661-671-00	LEVER, release; FWD	
142	3-661-676-00	LEVER, release; EJECT/REW	
143	♦3-661-684-00	PLATE (1), lock	
144	3-703-074-00	CAP 3, shaft	
145	4-859-001-00	SPRING, tension	

TUNER CHASSIS



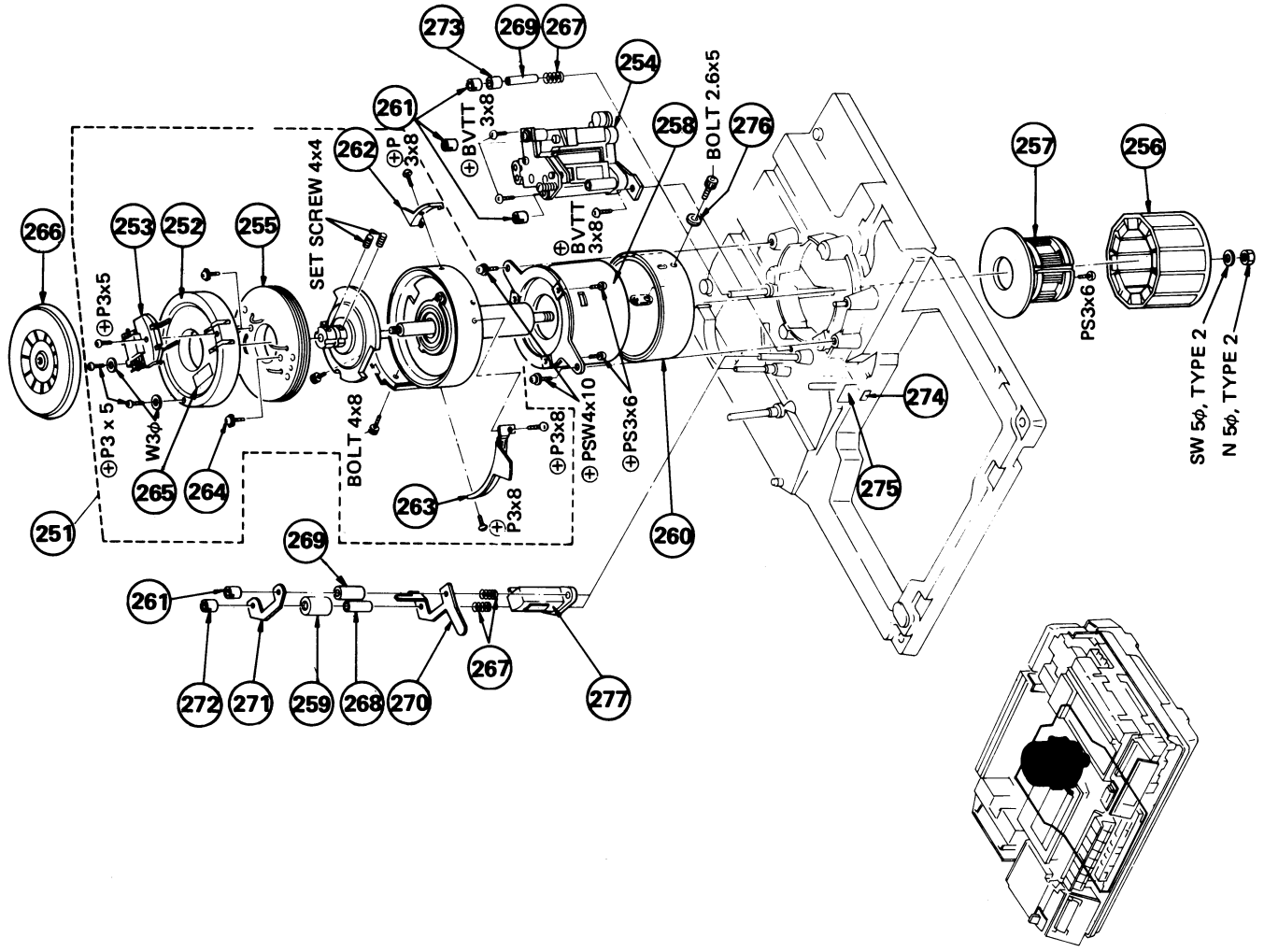
No.	Part No.	Description	Remark
151	X-3661-579-0	COVER ASS'Y, tuner	
152	3-659-792-00	HOLDER (D), LED	
153	▲ 3-661-562-00	FRAME, tuner	
154	▲ 3-661-618-00	PLATE, shield	
155	3-661-619-00	KNOB, slide	
156	▲ 3-661-656-00	CASE, shield; RF modulator	
157	3-661-678-00	HOLDER, indicator	
158	▲ 3-661-723-00	CASE, shield (main)	
159	▲ 3-661-724-00	LID, shield case	
160	▲ 3-661-753-00	FRAME (M), tuner	
161	3-661-775-00	BOARD, ornamental; preset	

POWER UNIT CHASSIS



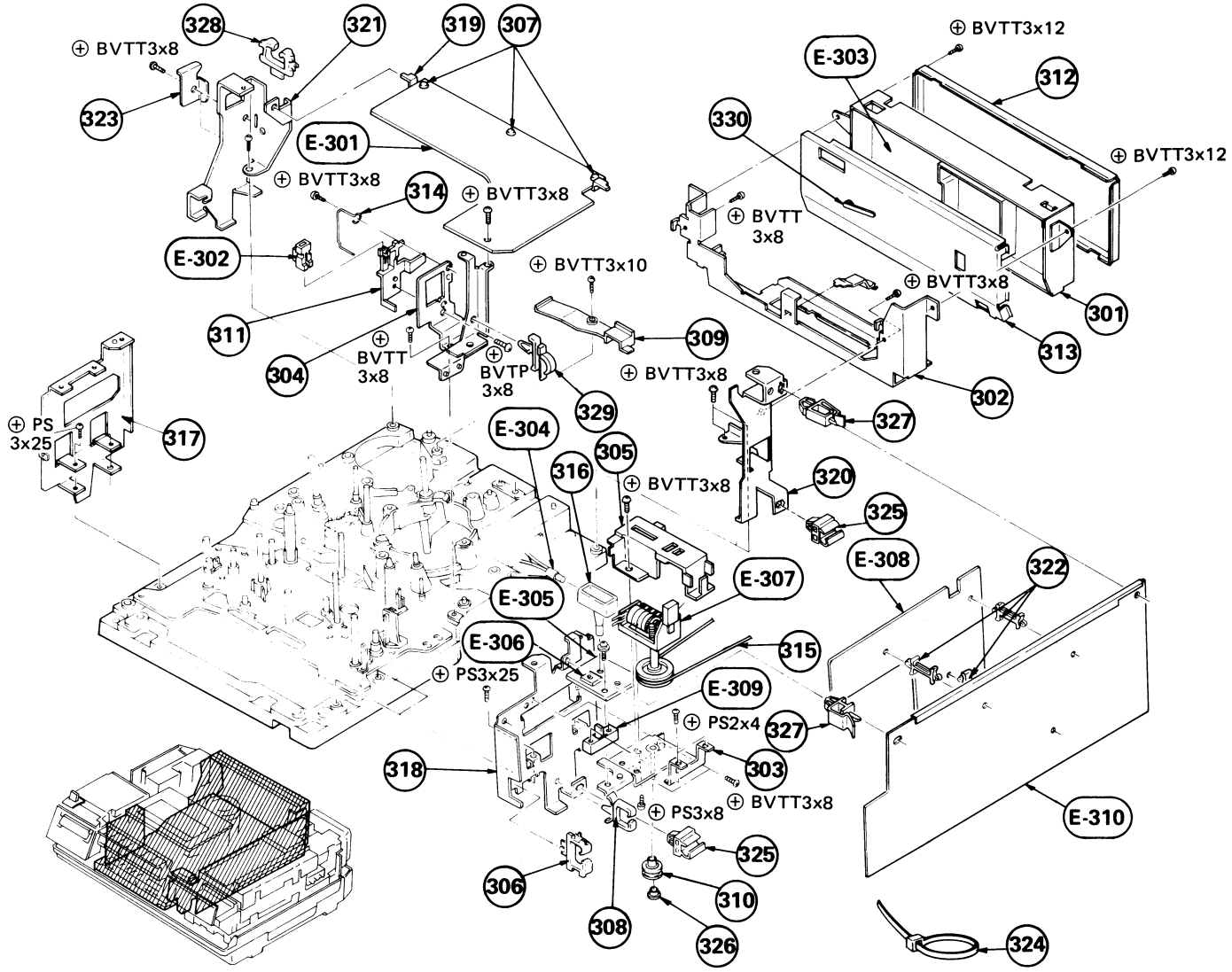
No.	Part No.	Description	Remark
201	X-3661-580-0	PANEL ASS'Y, timer control	
202	▲ X-3661-582-0	PLATE ASS'Y, shield; AC	
203	2-832-002-00	BUSHING, insulating	
204	▲ 3-659-514-00	BRACKET (A), heat sink	
205	▲ 3-659-515-00	BRACKET (B), heat sink	
206	▲ 3-659-670-00	PLATE SHIELD, transformer	
207	▲ 3-659-672-00	CHASSIS, power unit	
208	▲ 3-659-674-00	FRAME, rear timer	
209	3-659-743-00	SCREW, step	
210	▲ 3-661-559-00	FRAME (W), front timer	
211	▲ 3-661-576-00	HOLDER, LED	
212	▲ 3-661-615-00	HOLDER, interception	
213	▲ 3-661-623-00	BRACKET (W), power switch	
214	3-661-624-00	SHEET (W), blind	
215	3-661-645-00	KNOB, power switch	
216	▲ 3-661-677-00	HOLDER (W), indication tube	
217	3-661-725-00	KEY TOP (A)	
218	3-661-766-00	KEY TOP (B)	
219	3-661-768-00	KEY TOP (E)	
220	3-661-771-00	KEY, rubber	
221	▲ 3-661-783-00	HEAT SINK	
222	3-701-754-00	PLATE, insulating	
223	▲ 4-316-015-00	HOLDER, wire	

DRUM ASSEMBLY



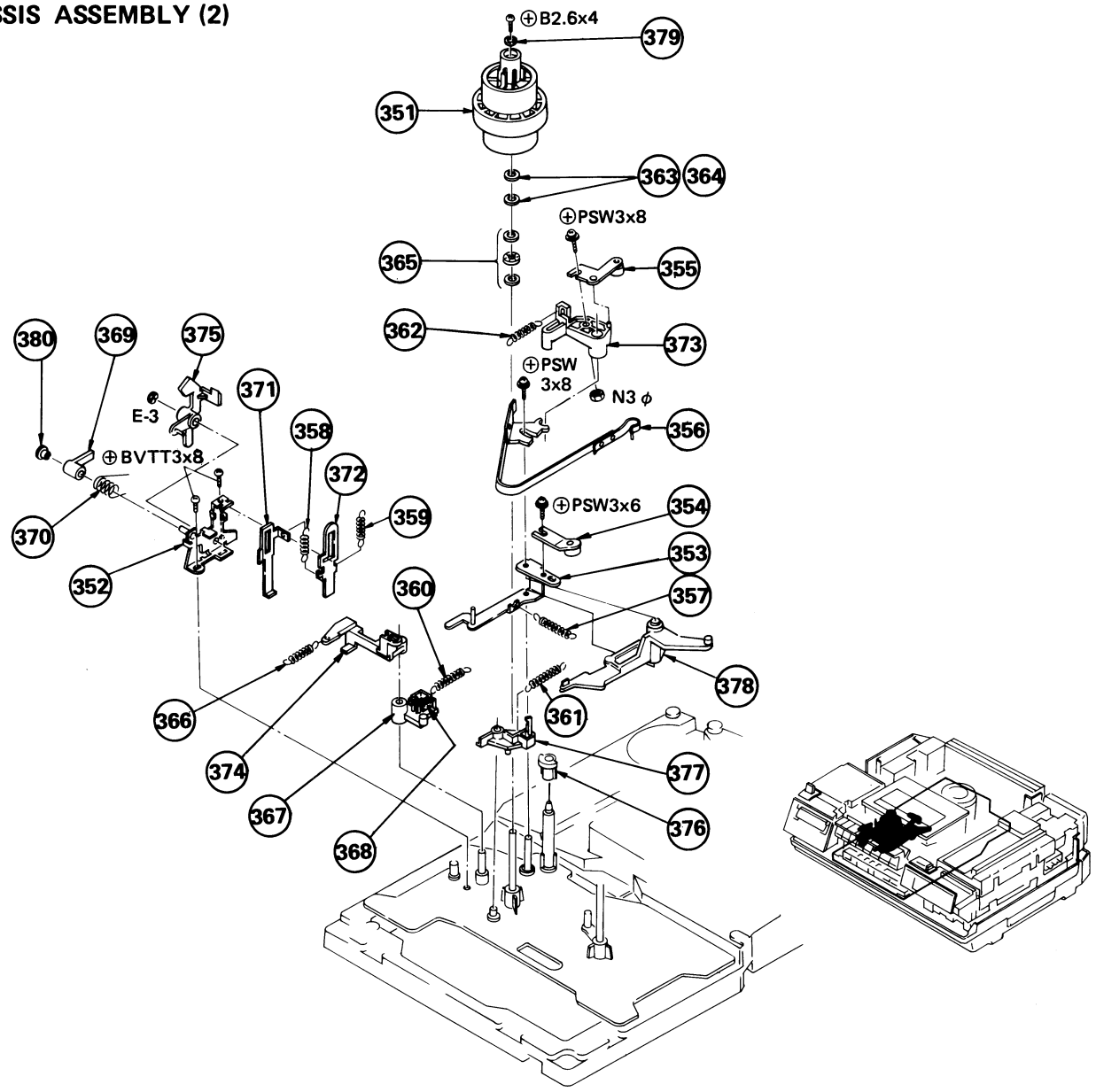
No.	Part No.	Description	Remark
251	A-6050-043-A	DRUM ASS'Y	252, 253, 255, 262, 263, 264, 265
252	A-6760-050-A	DRUM ASS'Y, upper	253
253	A-6761-013-B	SPRING ASS'Y, tape retainer	
254	A-6761-036-A	A.C.E. ASS'Y	261
255	A-6762-~~001~~ 063-A	VIDEO HEAD DISK ASS'Y ~ 069-A	
256	♦X-2619-402-0	ROTOR ASS'Y	
257	X-2619-403-0	STATOR ASS'Y	
258	X-3652-713-0	CASE ASS'Y, shield	
259	X-3659-304-0	ROLLER ASS'Y, guide; No. 1	
260	♦X-3659-376-0	SHIELD ASS'Y, drum	
261	3-645-562-00	NUT	
262	3-652-728-00	BRACKET (B), tape	
263	3-652-741-00	BRACKET (A), tape	
264	3-652-751-00	SCREW (⊕ P EXT tooth WS 3 x 8)	
265	♦3-652-783-00	LABEL	
266	3-658-122-00	FAN	
267	3-659-324-00	SPRING, compression	
268	3-659-341-00	SLEEVE, guide; No. 1	
269	3-659-342-00	SLEEVE, guide; No. 2	
270	♦3-659-343-00	BRACKET, tape; entrance	
271	3-659-344-00	PLATE, guide; entrance	
272	3-659-345-00	NUT, guide; No. 1	
273	3-659-716-00	FLANGE, guide	
274	3-660-902-00	LABEL, ID	
275	3-661-700-00	LABEL, serial number	
276	3-845-490-00	WASHER	
277	8-825-687-30	HEAD, full erase EF182-21	

CHASSIS ASSEMBLY (1)



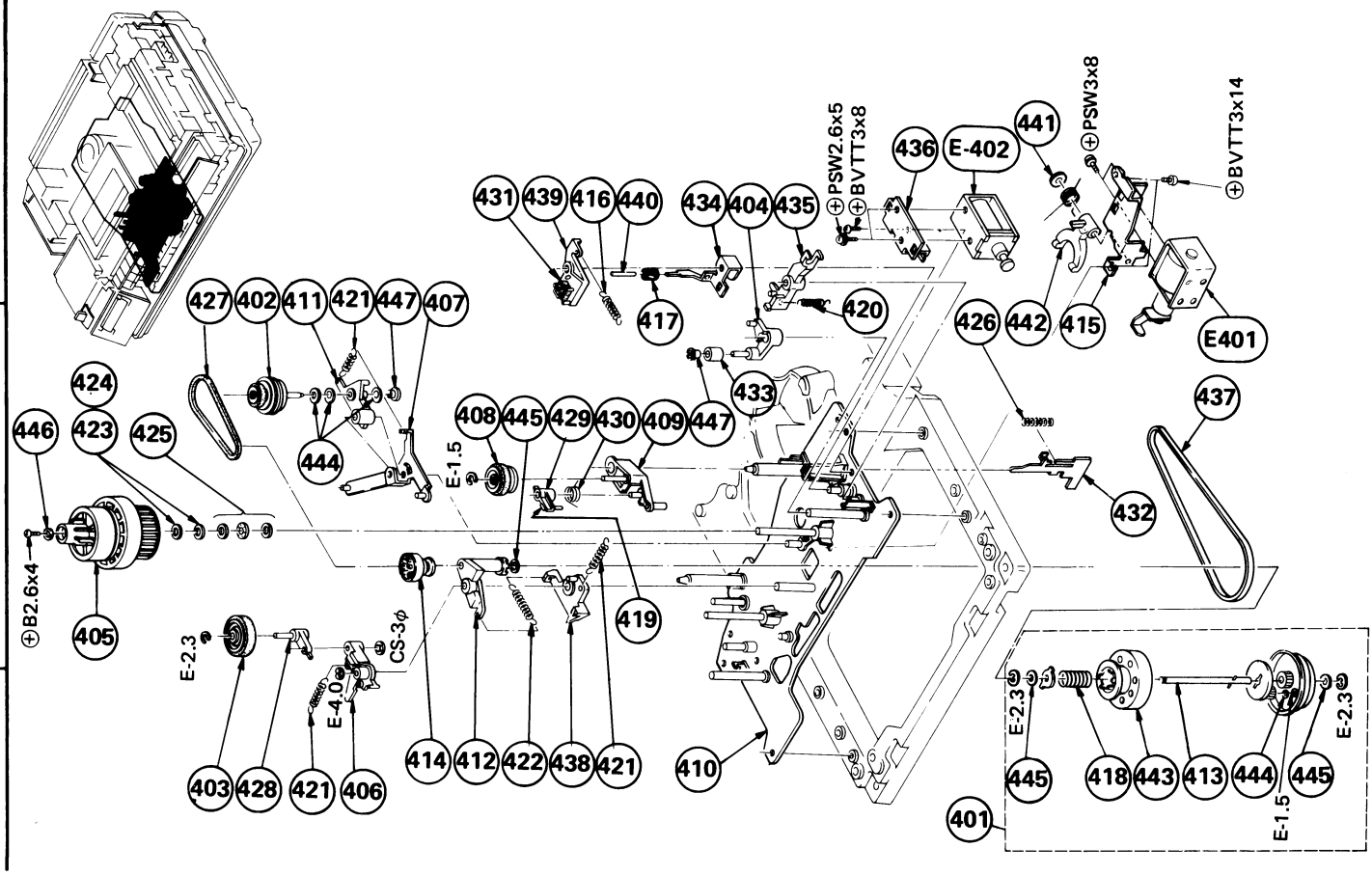
No.	Part No.	Description	Remark
301	♦ X-3659-339-0	CASE (A) MAIN ASS'Y, shield	
302	♦ X-3661-510-0	HOLDER ASS'Y, shield case	
303	♦ X-3661-513-0	BRACKET ASS'Y, counter	
304	♦ X-3661-567-0	OPENER ASS'Y, lid	
305	X-3661-576-0	COVER ASS'Y, counter	
306	3-646-071-00	HOLDER, wire	
307	3-646-090-00	RIVET, nylon	
308	♦ 3-655-214-00	CLIP, cable	
309	♦ 3-659-303-00	RETAINER (SMALL), harness	
310	3-659-484-00	PULLEY, midway; counter	
311	♦ 3-659-548-00	HOLDER, T sensor	
312	♦ 3-659-549-00	LID, bottom; shield case (A)	
313	♦ 3-659-661-00	LID, upper; shield case	
314	3-659-762-02	ARM, ejector static	
315	3-661-565-00	BELT, counter	
316	♦ 3-661-615-00	HOLDER, interception	
317	♦ 3-661-646-00	BRACKET, cassette-up (left)	
318	♦ 3-661-670-00	BRACKET (1), cassette (right)	
319	♦ 3-661-747-00	HOLDER, ID-2	
320	♦ 3-661-755-00	LEG (right), rear	
321	♦ 3-661-756-00	LEG (left), rear	
322	♦ 3-661-764-00	HOLDER, PCB	
323	♦ 3-663-008-00	SUPPORT, heat sink	
324	3-701-748-00	CLAMP	
325	♦ 3-703-072-00	HOLDER, plate; P	
326	3-703-075-00	CAP2, shaft	
327	♦ 3-703-141-00	HOLDER, PCB	
328	♦ 4-308-119-00	HOLDER, wire	
329	4-838-927-01	CRIP (A), wire	
330	♦ 4-857-472-00	CLAMP	

CHASSIS ASSEMBLY (2)



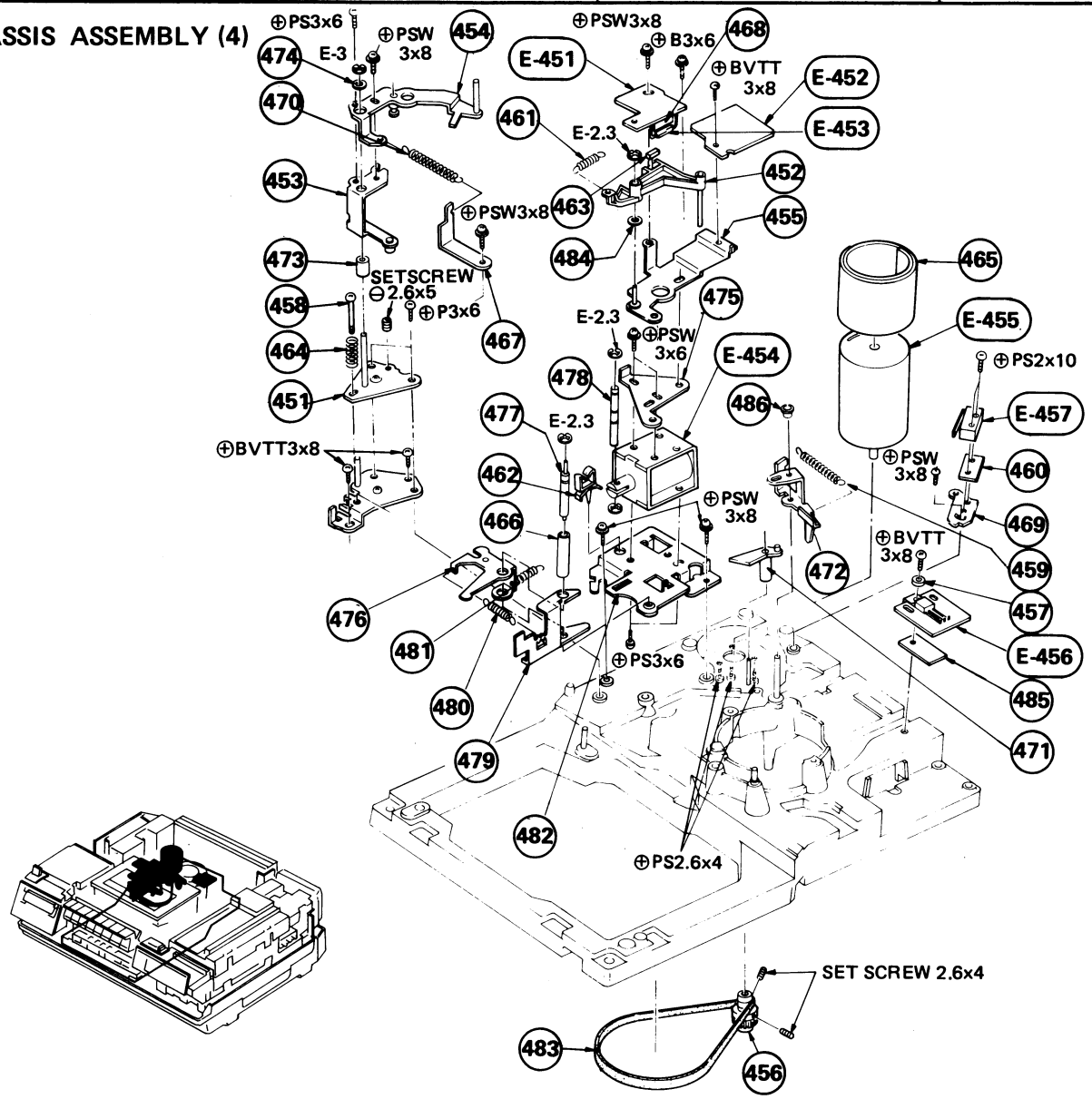
No.	Part No.	Description	Remark
351	X-3659-315-0	REEL ASS'Y, S	
352	♦X-3659-317-0	BRACKET ASS'Y, lock	
353	♦X-3659-322-0	ARM ASS'Y, ring	
354	X-3659-323-0	PLATE ASS'Y, adjustment; R	
355	X-3659-326-0	ARM ASS'Y, cassette compartment	
356	X-3659-328-2	BAND ASS'Y, tension regulator	
357	3-143-060-00	SPRING, tension	
358	3-492-150-00	SPRING, tension	
359	3-532-725-00	SPRING, tension	
360	3-534-217-00	SPRING, tension	
361	3-536-006-XX	SPRING, tension	
362	3-537-205-00	SPRING, tension	
363	3-646-184-00	SPACER (T: 0.2)	
364	3-646-184-11	SPACER (T: 0.1)	
365	3-646-185-00	BEARING	
366	3-648-626-00	SPRING, tension	
367	♦3-659-445-00	BRAKE, S	
368	3-659-446-00	LINING, brake	
369	♦3-659-454-00	ARM, ring lock	
370	3-659-455-00	SPRING	
371	♦3-659-457-00	PLATE, slide; MS	
372	♦3-659-458-00	DETECTION, cassette	
373	♦3-659-562-00	ARM (1), cassette compartment	
374	♦3-659-567-00	BRAKE, soft	
375	3-659-624-00	LOCK, cassette compartment	
376	3-660-916-00	STOPPER, END	
377	♦3-661-564-00	LEVER, press; REW	
378	♦3-661-589-00	ARM, BS	
379	3-701-441-21	WASHER	
380	3-703-074-00	CAP3, shaft	

CHASSIS ASSEMBLY (3)



No.	Part No.	Description	Remark
401	A-6740-051-C	PULLEY BLOCK ASS'Y, clutch	413, 418, 443, 444, 445
402	X-3653-310-0	LIMITER ASS'Y, FWD	
403	X-3653-315-0	IDLER ASS'Y	
404	♦X-3659-311-0	ARM ASS'Y, TB	
405	X-3659-316-3	REEL ASS'Y, T	
406	♦X-3659-318-0	BRACKET ASS'Y, adjustment	
407	X-3659-319-0	LEVER ASS'Y, FWD	
408	X-3659-324-0	IDLER ASS'Y, E	
409	♦X-3659-325-0	ARM ASS'Y, E idler	
410	♦X-3659-347-0	CHASSIS ASS'Y, mechanism	
411	X-3659-410-0	ARM ASS'Y, FWD	
412	X-3661-512-2	ARM ASS'Y, FF	
413	X-3661-518-0	SHAFT ASS'Y, pulley midway	
414	X-3661-520-0	PULLEY ASS'Y, midway	
415	♦X-3661-572-0	FRAME ASS'Y, solenoid	
416	3-534-217-00	SPRING, tension	
417	3-538-051-11	RUBBER, BRAKE	
418	3-543-966-00	SPRING, compression	
419	3-553-038-00	SPACER, EBF	
420	3-632-263-00	SPRING, tension	
421	3-642-483-00	SPRING, tension	
422	3-645-168-00	SPRING, tension	
423	3-646-184-00	SPACER (T: 0.2)	
424	3-646-184-11	SPACER (T: 0.1)	
425	3-646-185-00	BEARING	
426	3-646-312-00	SPRING	
427	3-653-324-00	BELT, FWD	
428	♦3-659-416-00	LEVER, REW	
429	♦3-659-431-00	CLAW, ratchet	
430	3-659-432-00	SPRING	
431	3-659-446-00	LINING, brake	
432	♦3-659-456-00	PLATE, erasing protection	
433	3-659-464-00	ROLLER, TB arm	
434	♦3-659-468-00	BRAKE, P	
435	♦3-659-469-00	ARM PRESS, PB	
436	♦3-659-470-00	BASE, PB solenoid	
437	3-659-471-00	BELT, FF	
438	♦3-659-564-00	LEVER, FF press	
439	♦3-659-791-00	BRAKE, T	
440	♦3-660-941-00	RETAINER, brake rubber	
441	3-661-570-00	SPRING	
442	♦3-661-574-00	LEVER, clutch	
443	3-661-674-02	CLUTCH, gear	
444	3-701-437-21	WASHER	
445	3-701-439-21	WASHER	
446	3-701-441-21	WASHER	
447	3-703-075-00	CAP2, shaft	

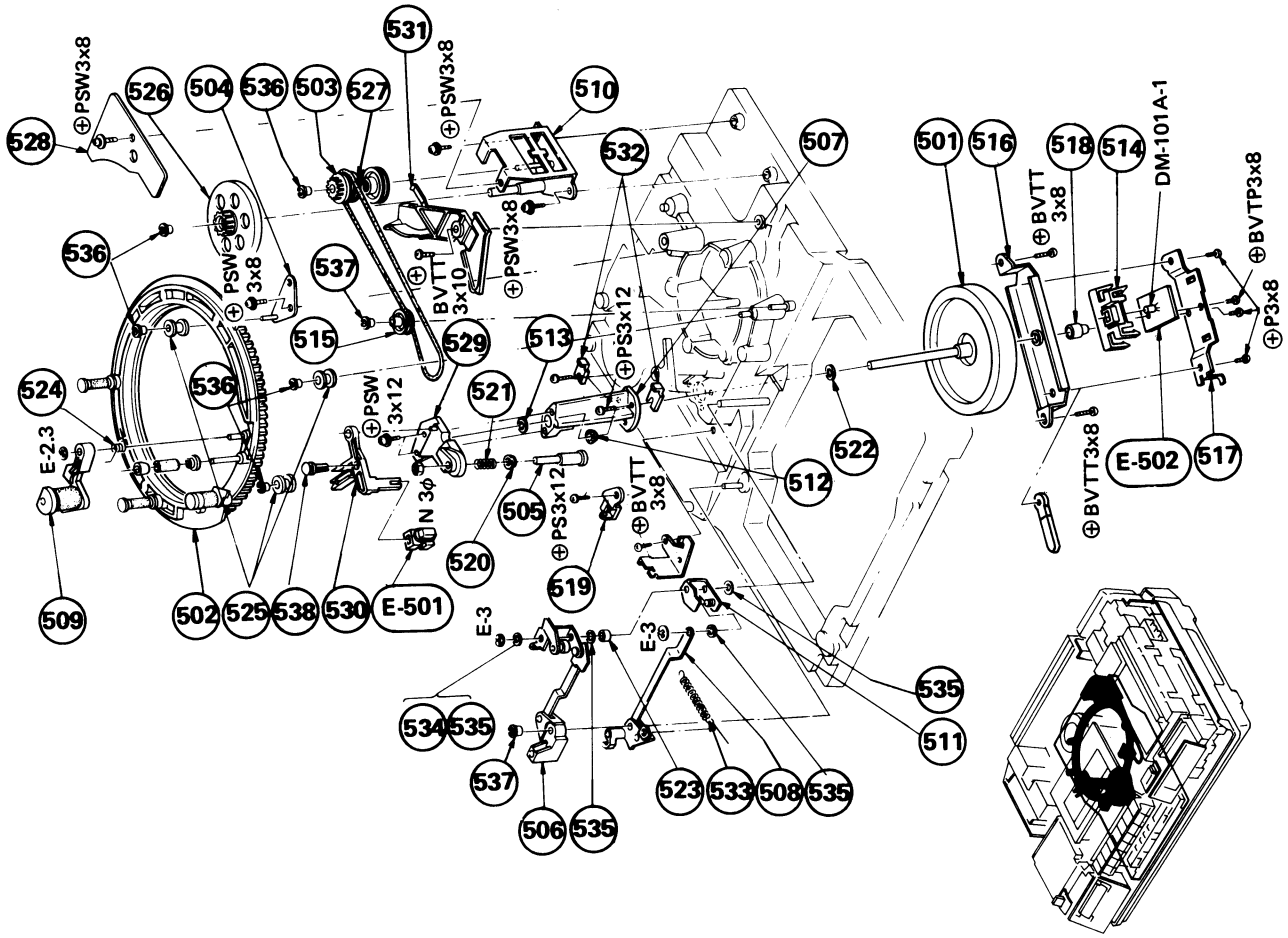
CHASSIS ASSEMBLY (4)



No.	Part No.	Description	Remark
451	♦X-3659-305-0	PLATE ASS'Y, adjustment	
452	X-3659-310-0	ARM ASS'Y, detection; slack	
453	♦X-3659-369-0	ARM ASS'Y, tension regulator	
454	♦X-3659-370-2	PLATE ASS'Y, arm	
455	♦X-3659-380-0	BASE ASS'Y	
456	X-3661-524-0	PULLEY ASS'Y, motor	
457	2-832-002-00	BUSHING, insulating	
458	♦3-437-173-02	SCREW, head adjusting	
459	3-533-223-11	SPRING, tension	
460	3-534-263-00	INSULATOR	
461	3-542-476-00	SPRING, tension	
462	♦3-644-407-00	CLIP, AC wire; E	
463	3-646-571-00	MAGNET	
464	3-652-413-00	SPRING, compression	
465	♦3-658-173-00	SHIELD, capstan	
466	♦3-658-194-00	SPACER (4-25)	
467	♦3-659-319-00	PLATE, adjustment; BT	
468	♦3-659-359-00	PLATE, boost; reed switch	

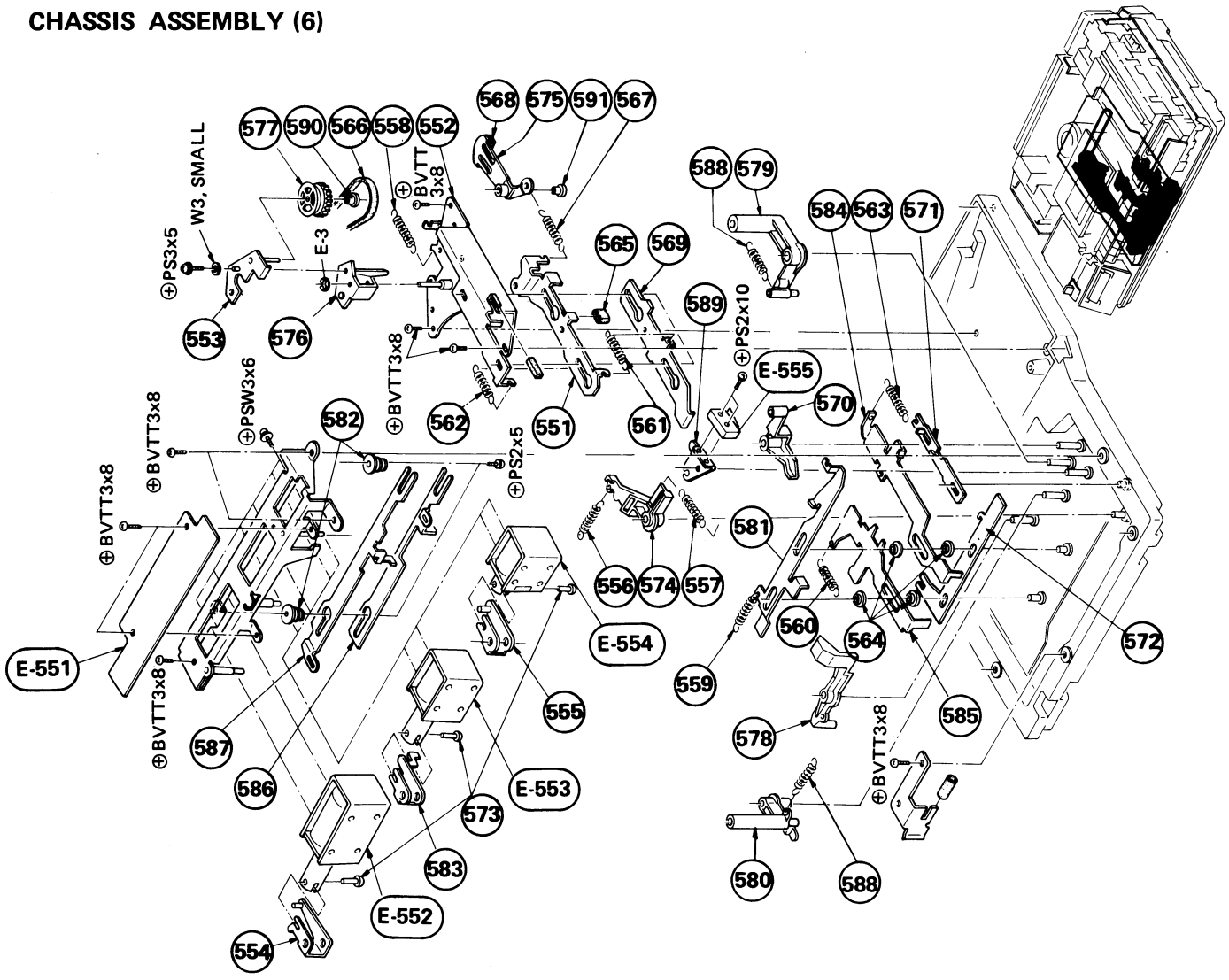
No.	Part No.	Description	Remark
469	♦3-659-360-00	BRACKET, threading end; MS	
470	3-659-378-02	SPRING, tension	
471	♦3-659-392-00	ARM, lock keep	
472	♦3-659-557-03	ARM, lock keep	
473	3-659-757-00	SPACER	
474	3-659-758-00	WASHER	
475	♦3-659-775-00	PLATE, adjustment; lever shaft	
476	♦3-659-777-00	LEVER (B), pinch press	
477	♦3-659-778-00	SHAFT, pinch press lever	
478	♦3-659-780-00	PIN, LEVER, pinch press	
479	♦3-659-781-00	LEVER (A), pinch press	
480	3-659-784-00	SPRING, tension	
481	3-659-785-00	SPRING, tension	
482	♦3-659-789-00	BASE, pinch plunger	
483	3-661-708-00	BELT, capstan	
484	3-701-439-21	WASHER	
485	3-701-754-00	PLATE, insulating	
486	3-703-074-00	CAP3, shaft	

CHASSIS ASSEMBLY (5)



No.	Part No.	Description	Remark
501	A-6735-029-A	CAPSTAN BLOCK ASS'Y	
502	A-6750-087-A	RING BLOCK ASS'Y, threading	509, 524
503	X-3659-301-0	LIMITER ASS'Y, E	
504	♦X-3659-307-0	SUPPORT ASS'Y, ring roller	
505	X-3659-308-0	GUIDE ASS'Y, No. 0	
506	X-3659-333-0	STOPPER ASS'Y, tension regulator	
507	X-3659-334-0	HOUSING ASS'Y, capstan	
508	X-3659-335-5	LINK ASS'Y (1), release	
509	X-3659-337-0	ARM ASS'Y, pinch roller	
510	♦X-3659-340-0	BRACKET ASS'Y, midway pulley	
511	X-3659-386-3	LINK ASS'Y (2), release	
512	3-646-182-00	CAP, oil	
513	3-646-183-00	ABSORBER, capstan oil	
514	3-658-161-00	HOLDER, DME	
515	3-659-302-00	PULLEY, idle	
516	3-659-312-00	RETAINER, capstan	
517	♦3-659-313-00	PLATE, adjustment; DME	
518	3-659-314-00	RETAINER, thrust	
519	♦3-659-320-00	HOOK, spring; release	
520	3-659-337-00	FLANGE No. 0, guide upper	
521	3-659-338-00	SPRING, compression	
522	3-659-350-00	POLY-SLIDER (3.4 φ)	
523	3-659-365-00	SPACER	
524	3-659-388-00	SPRING	
525	3-659-391-00	ROLLER, ring	
526	3-659-396-00	GEAR (B), midway	
527	3-659-397-00	BELT, eject	
528	♦3-659-414-00	PLATE, control	
529	3-659-551-00	FRAME, guide; No. 0	
530	♦3-659-632-00	HOLDER, S sensor	
531	♦3-659-691-00	RETAINER (LARGE), harness	
532	3-659-759-11	SPACER, capstan	
533	3-660-911-00	SPRING, tension	
534	3-701-441-11	WASHER	
535	3-701-441-21	WASHER	
536	3-703-074-00	CAP3, shaft	
537	3-703-075-00	CAP2, shaft	
538	4-829-039-00	RIVET, nylon	

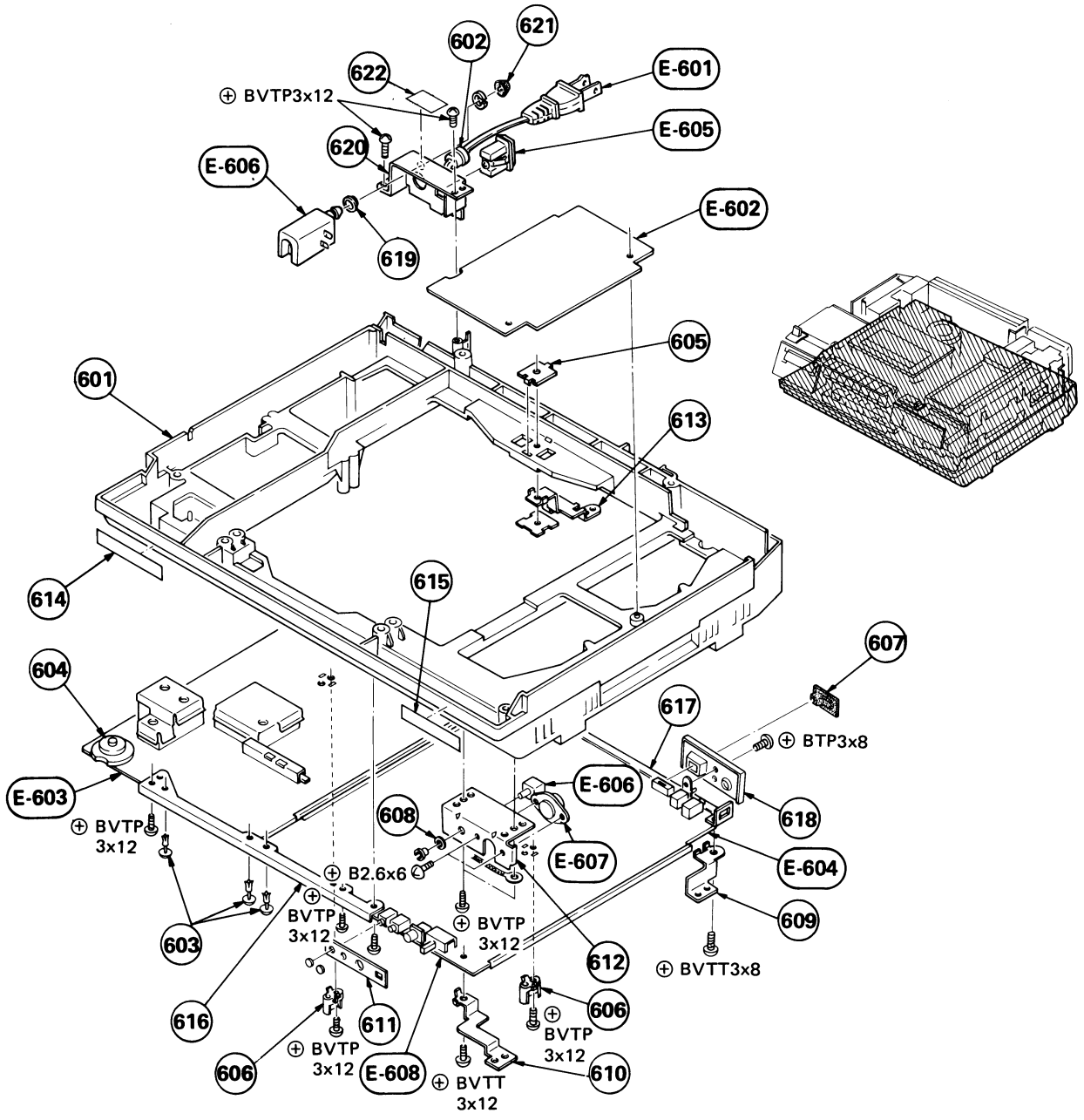
CHASSIS ASSEMBLY (6)



No.	Part No.	Description	Remark
551	♦X-3659-303-0	LEVER (LOWER) ASS'Y, eject	
552	♦X-3659-359-0	BASE ASS'Y, threading unit	
553	♦X-3659-360-0	ARM (B) ASS'Y, gear pulley hold	
554	♦X-3661-515-0	LEVER ASS'Y, F	
555	♦X-3661-516-0	LEVER ASS'Y, R	
556	3-143-060-00	SPRING, tension	
557	3-532-125-00	SPRING, tension	
558	3-533-223-11	SPRING, tension	
559	3-535-411-00	SPRING, tension	
560	3-639-371-00	SPRING, tension	
561	3-642-510-00	SPRING, tension	
562	♦3-642-513-00	SPRING, tension	
563	3-645-135-00	SPRING, tension	
564	3-646-271-00	BOSS	
565	3-655-856-11	RETAINER, tension regulator	
566	3-659-301-00	BELT, threading	
567	3-659-393-00	SPRING, tension	
568	3-659-394-00	SHOE, brake	
569	♦3-659-395-00	LEVER (UPPER), eject	
570	3-659-453-00	ARM, EL	

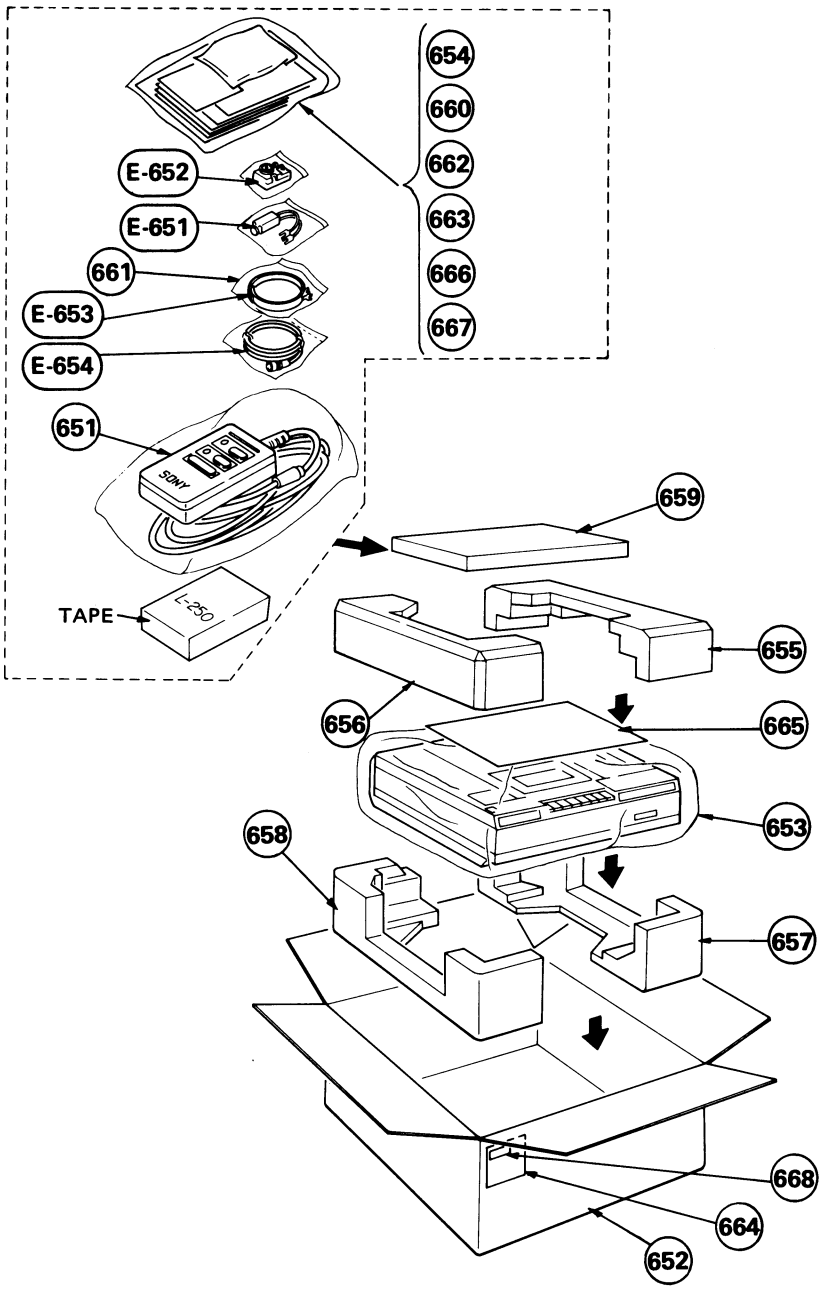
No.	Part No.	Description	Remark
571	♦3-659-460-00	PLATE, release; lock	
572	♦3-659-461-00	JOINT	
573	3-659-481-00	PIN, solenoid	
574	3-659-560-00	ARM, E	
575	♦3-659-679-00	ARM, motor brake	
576	♦3-659-705-00	ARM (A), gear pulley hold	
577	3-659-706-00	PULLEY, gear	
578	♦3-661-590-00	LEVER, release; slide switch	
579	♦3-661-597-00	LEVER (A), slide switch	
580	♦3-661-598-00	LEVER (R), slide switch	
581	♦3-661-599-00	PLATE, slide; REC	
582	3-661-601-00	GUIDE (1, 6), 2 step slide	
583	♦3-661-602-00	LEVER, FF	
584	♦3-661-608-00	PLATE, slide; FWD	
585	3-661-630-00	PLATE, slide; DUB	
586	♦3-661-672-00	PLATE, slide; R	
587	♦3-661-673-00	PLATE, slide; F	
588	3-661-712-00	SPRING, tension	
589	♦3-663-005-00	BRACKET (P), CSW	
590	3-703-074-00	CAP3, shaft	
591	3-703-075-00	CAP2, shaft	

LOWER FRAME ASSEMBLY



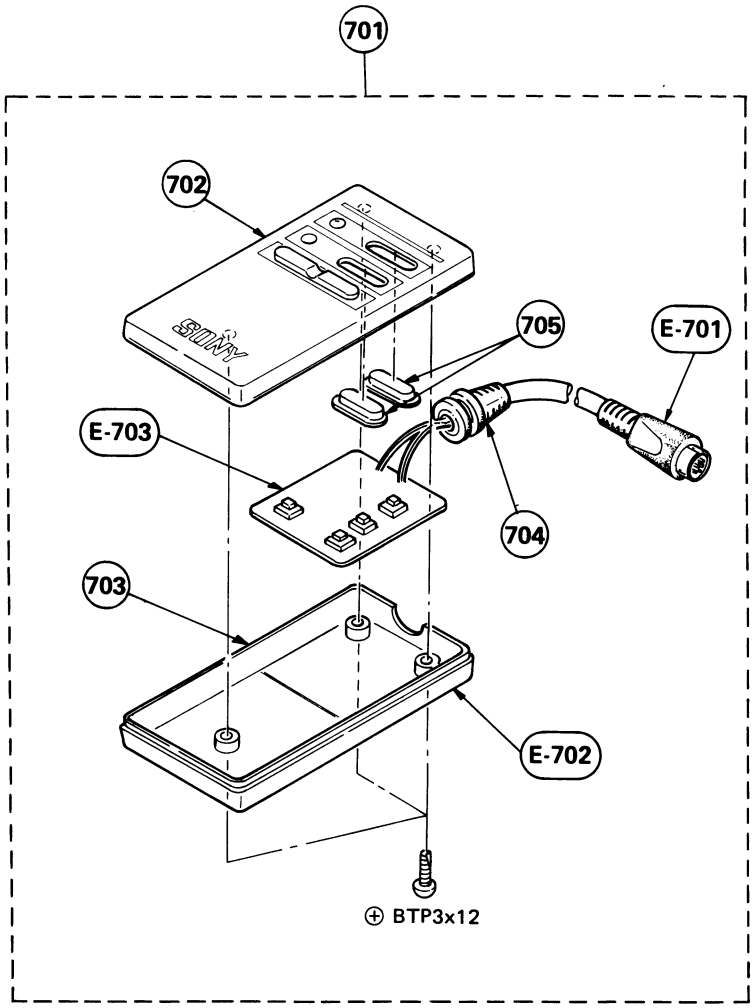
No.	Part No.	Description	Remark
601	X-3661-528-0	FRAME ASS'Y, lower ----	613, 614, 615
602	2-231-019-00	CLAMPER, cord	
603	3-646-090-00	RIVET, nylon	
604	3-659-528-00	KNOB, tracking control	
605	♦ 3-659-529-00	SPACER, plate	
606	3-659-530-00	BLOCK, support; bottom plate	
607	3-659-720-00	STOPPER, slide switch	
608	3-660-907-00	WASHER	
609	♦ 3-661-571-00	PLATE (A), ground; bottom plate	
610	♦ 3-661-572-00	PLATE (B), ground; bottom plate	
611	3-661-620-00	COVER, input	
612	♦ 3-661-621-00	BRACKET, connector	
613	♦ 3-661-622-00	JOINT, ground	
614	3-661-627-00	LABEL, tracking control	
615	3-661-628-00	LABEL, input	
616	♦ 3-661-657-00	BRACKET (A), chassis	
617	♦ 3-661-658-00	BRACKET (B), chassis	
618	3-661-707-00	COVER, output	
619	3-661-733-00	COLLAR, power panel	
620	3-661-748-00	PANEL, power	
621	3-663-011-01	CAP, cc terminal	
622	3-703-044-26	LABEL, caution	

PACKING



No.	Part No.	Description	Remark
651	A-6701-090-A	COMMANDER ASS'Y, remote	
652	X-3661-585-0	INDIVIDUAL CARTON ASS'Y	
653	3-656-390-00	BAG, protection	
654	3-661-648-00	INDICATOR (W), accessory	
655	3-661-694-00	CUSHION, right upper	
656	3-661-695-00	CUSHION, left upper	
657	3-661-696-00	CUSHION, right lower	
658	3-661-697-00	CUSHION, left lower	
659	3-661-699-00	CASE, accessory	
660	3-701-352-00	BAG, polyethylene	
661	3-701-625-00	BAG, polyethylene	
662	3-770-987-21	MANUAL, instruction	
663	3-771-987-21	QUESTIONNAIRE	
664	3-783-101-21	LABEL, destination	
665	3-793-962-21	CARD, caution	
666	3-794-671-21	GUIDE, instant information	
667	4-491-335-21	CARD, warranty	
668	4-491-336-21	REGISTRATION	
E-651	1-417-063-00	TRANSFORMER, antenna (EAC-24)	
E-652	1-513-379-00	CONVERTER (EAC-25)	
E-653	1-551-139-00	CORD, connection	
E-654	1-551-644-41	CORD, connection	

COMMANDER BLOCK ASSEMBLY



No.	Part No.	Description	Remark
701	A-6701-090-A	COMMANDER ASS'Y, remote	702 – 707
702	X-3661-574-0	CASE ASS'Y, upper	
703	X-3661-575-0	CASE ASS'Y, lower	
704	3-659-700-00	BUSHING, cord	
705	3-659-728-11	PAUSE, key top	
706	3-701-613-00	BAG, polyethylene	
707	3-701-625-00	BAG, polyethylene	
E-701	1-551-761-00	CORD, with DIN plug 8P	
E-702	1-552-412-00	SWITCH, key board	
E-703	♦1-601-978-00	RC-5 Board	

SECTION 5
ELECTRICAL PARTS LIST

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

- ⇒ : Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.
- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS

- All capacitors are in μF and ceramic unless otherwise noted. 50WV or less are not indicated except for electrolytics. p : μμF, elect : electrolytic

RESISTORS

- All resistors are in ohms. Common ¼W carbon resistors are omitted. Refer to the list on page for their part numbers.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
  kΩ : 1000Ω, MΩ : 1000kΩ

COILS

- All coils are microinductors unless ohterwise noted.

Ref. No.	*Part No.*	*Description*	*Remark*
		CN-3 BOARD	
♦	1-601-151-00	CN-3 Board	E-452
♦ CN201	1-508-734-00	3P Connector	
♦ CN202	1-508-734-00	3P Connector	
		CN-4 BOARD	
♦	1-601-152-00	CN-4 Board	E-451
S251	1-552-180-00	Reed, slack sensor	E-453
		CR-6 BOARD	
♦	A-6711-210-A	CR-6 Board, complete	E-602
C401	1-123-306-00	47 10V elect	
C402	1-102-978-00	220p	
C403	1-161-051-00	0.01	
C404	1-161-323-00	0.001	
C405	1-123-308-00	220 10V elect	
C406	1-161-051-00	0.01	
C407	1-161-263-00	22p	
C408	1-161-051-00	0.01	
C409–412	1-161-036-00	0.047	
C413	1-123-306-00	47 10V elect	
C414	1-102-963-00	33p	
C415	1-123-306-00	47 10V elect	
C416	1-102-963-00	33p	
C417	1-161-036-00	0.047	
C418	1-161-263-00	22p	
C419	1-123-317-00	22 16V elect	
C420	1-161-051-00	0.01	
C421	1-123-320-00	100 16V elect	
C422	1-123-319-00	47 16V elect	
C423	1-123-352-00	1 50V elect	
C424	1-108-792-00	0.001 mylar	
C425	1-161-036-00	0.047	
C426	1-123-318-00	33 16V elect	
C427	1-123-320-00	100 16V elect	
C428	1-123-319-00	47 16V elect	
C429	1-102-950-00	13p	
C430	1-161-036-00	0.047	
C431	1-108-569-00	0.0039 mylar	
C432	1-123-317-00	22 16V elect	
C433	1-161-036-00	0.047	
C434	1-123-352-00	1 50V elect	
C435	1-108-563-00	0.0022 mylar	
C436	1-108-792-00	0.001 mylar	
C437	1-108-577-00	0.0082 mylar	
C438	1-123-355-00	4.7 50V elect	
C439	1-123-317-00	22 16V elect	
C440	1-161-051-00	0.01	
C441	1-161-323-00	0.001	
D401–412	8-719-815-55	1S1555	

Ref. No.	Part No.	Description	Remark
DL401	1-415-169-00	Delay Line (½H)	
IC401, 402	8-751-360-00	CX136A	
IC403	8-743-600-00	BX360	
IC404	8-743-610-00	BX361	
IC405	8-751-300-00	CX130	
L401, 402	1-407-686-00	2.7μH	
L403, 404	1-407-167-XX	68μH	
L405	1-407-169-XX	100μH	
LV401	1-407-569-00	Carrier Phase	
Q401–404	8-724-375-01	2SC403C	
⇒ Q405	8-729-663-47	2SC1364	
⇒ Q406	8-729-612-77	2SA1027R	
⇒ Q407–409	8-729-663-47	2SC1364	
⇒ Q410	8-729-612-77	2SA1027R	
⇒ Q411	8-729-663-47	2SC1364	
⇒ Q412	8-729-612-77	2SA1027R	
R440	1-214-129-00	750 ¼W film	
R441	1-214-147-00	4.3k ¼W film	
RV401, 402	1-224-644-XX	4.7k, adjustable; Y LEVEL/DC BIAS	
RV403	1-224-646-XX	22k, adjustable; C LEVEL	
RV404	1-224-647-XX	47k, adjustable; VCO	
T401	1-433-215-00	Transformer, 10.24MHz OSC	
X401	1-527-293-00	Crystal, 10.24MHz	

DT-15 BOARD

♦	1-601-974-00	DT-15 Board	E-202
FL001	1-519-198-00	Fluorescent Indicator Tube	E-203

DT-16 BOARD

♦	A-6728-106-A	DT-16 Board	E-206
C102	1-107-075-00	39p mica	
D101	8-719-139-07	RD3.9E	
D102	8-719-815-55	1S1555	
⇒ IC101	8-759-981-80	MB8841-180	
IC102, 103	8-759-100-56	μPA56C	
Q101, 102	8-729-978-62	2SA786	
R110	1-214-143-00	3k ¼W film	
RB101, 102	1-231-659-00	Composition Circuit, 20k x 7	

DT-17 BOARD

♦	A-6728-107-A	DT-17 Board	E-205
C201, 202	1-123-317-00	22 16V elect	
C203, 204	1-123-316-00	10 16V elect	
C205	1-123-356-00	10 50V elect	
C206, 207	1-123-328-00	4.7 25V elect	
♦ CN201	1-561-340-00	15P Connector	
♦ CN7001	1-508-910-00	12P Connector	
♦ CN7002	1-508-744-00	10P Connector	
♦ CN7003	1-508-742-00	3P Connector	
D201	8-719-815-55	1S1555	
D203, 204	8-719-812-41	TLR124	
D205	8-719-815-55	1S1555	
D206	8-719-200-02	10E2	
D207–212	8-719-815-55	1S1555	
⇒ D213	8-719-151-77	RD5.1E-C	
IC201	8-759-178-05	μPC78L05	
IC202	8-759-240-81	TC4081BP	
IC203	8-759-240-01	μPD4001C	
L201	1-407-191-XX	470μH	
PL201	1-518-393-00	Lamp, pilot; POWER	
PL202	1-518-391-00	Lamp, pilot; PAUSE	
PL203	1-518-392-00	Lamp, pilot; REC	
Q201–203	8-729-902-11	2SC2021	
Q204	8-729-978-62	2SA786	
Q205, 206	8-729-902-11	2SC2021	
RB201	1-231-599-00	Composition Circuit, 10k x 4	
S201	1-516-977-00	Lever Slide, BRIGHT/DIN	E-212

DT-18 BOARD

♦	1-601-973-00	DT-18 Board	E-213

• Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Ref. No.	Part No.	Description	Remark
♦ CN301	1-560-211-00	15P Connector	
DB301–304	8-759-100-54	μPA54H	
RB301	1-231-569-00	Composition Circuit, 22k x 4	

DT-19 BOARD

♦	1-601-977-00	DT-19 Board	E-201
D401, 402	8-719-815-55	1S1555	
S401	1-552-267-00	Lever Slide, POWER	E-204

FG-1 BOARD

♦	1-600-101-00	FG-1 Board	E-502
DM6701	8-745-101-01	DM-101	

ID-2 BOARD

♦	A-6715-095-A	ID-2 Board, complete			E-301
C701	1-123-320-00	100	16V	elect	
C702	1-131-341-00	0.1	35V	tantalum	
C703	1-123-317-00	22	16V	elect	
C704	1-123-316-00	10	16V	elect	
C705	1-123-317-00	22	16V	elect	
C706	1-123-307-00	100	10V	elect	
C707, 708	1-102-106-00	100p			
C709	1-123-320-00	100	16V	elect	
C710	1-161-016-00	0.018			
C711	1-123-316-00	10	16V	elect	
C712	1-101-004-00	0.01			
C713	1-102-963-00	33p			
C714	1-123-298-00	470	6.3V	elect	
C715	1-123-316-00	10	16V	elect	
C716	1-123-296-00	220	6.3V	elect	
C717	1-123-319-00	47	16V	elect	
C718, 719	1-161-034-00	0.022			
C720	1-131-343-00	0.22	35V	tantalum	
C721	1-161-039-00	0.001			
C722	1-161-021-00	0.047			
C723	1-131-341-00	0.1	35V	tantalum	
C724	1-123-317-00	22	16V	elect	
♦ CN701	1-508-846-00	8P Connector			
♦ CN702	1-508-734-00	3P Connector			
♦ CN703	1-508-734-21	3P Connector			
♦ CN704	1-508-742-00	3P Connector			
D701–710	8-719-815-55	1S1555			
IC701	8-759-271-20	TA7120P			
IC702	8-759-240-11	TC4011BP			
⇒ Q701	8-729-612-77	2SA1027R			
⇒ Q702	8-729-663-47	2SC1364			
⇒ Q703	8-729-612-77	2SA1027R			
⇒ Q704–710	8-729-663-47	2SC1364			
⇒ Q711	8-729-612-77	2SA1027R			
⇒ Q712, 713	8-729-663-47	2SC1364			
⇒ Q714	8-729-612-77	2SA1027R			
⇒ Q715, 716	8-729-663-47	2SC1364			

IF-11 BOARD

♦	A-6721-040-A	IF-11 Board, complete			E-152
C001	1-102-528-00	91p			
C002	1-161-269-00	68p			
C003	1-101-880-00	47p			
C004	1-102-525-00	68p			
C005–008	1-102-121-00	0.0022			
C009	1-123-319-00	47	16V	elect	
C010	1-102-121-00	0.0022			
C011	1-123-351-00	0.47	50V	elect	
C012	1-161-051-00	0.01			
C013–015	1-102-121-00	0.0022			
C016	1-123-352-00	1	50V	elect	
C017	1-102-936-00	3p			
C022	1-108-377-00	0.01	100V	mylar	
C023	1-123-320-00	100	16V	elect	
C024–026	1-123-351-00	0.47	50V	elect	
C027	1-101-804-00	10p	500V		
C028	1-123-267-00	2.2	160V	elect	
C029	1-108-377-00	0.01	100V	mylar	
C030	1-102-973-00	100p			
C041	1-123-323-00	470	16V	elect	
C042	1-101-004-00	0.01			

• Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Ref. No.	Part No.	Description			Remark
C043	1-161-263-00	22p			
C044	1-102-668-00	15p			
C045	1-102-116-00	680p			
C046	1-101-006-00	0.047			
C047	1-108-379-00	0.015	100V	mylar	
C048	1-123-318-00	33	16V	elect	
C051	1-102-493-00	62p			
C052	1-102-519-00	36p			
C053	1-101-576-00	1.5p			
C054–060	1-102-121-00	0.0022			
C061	1-102-809-00	7p			
C062	1-102-121-00	0.0022			
C063	1-102-936-00	3p			
C081	1-123-295-00	100	6.3V	elect	
C082	1-102-945-00	8p			
C084	1-123-320-00	100	16V	elect	
C085	1-123-319-00	47	16V	elect	
CF001	1-527-260-00	Ceramic Filter			
♦ CN001	1-508-744-00	10P Connector			
♦ CN002, 003	1-508-846-00	8P Connector			
♦ CN004	1-508-845-00	6P Connector			
CT001, 002	1-409-332-00	Ceramic Trap			
D001	8-759-157-40	μPC574J			
⇒ D002	8-719-331-10	UF1A			
D003	8-719-815-55	1S1555			
IC001	8-751-771-10	CX177B			
IC002	8-759-601-95	CX095C			
⇒ IC003	8-759-651-35	M5135P			
L001	1-425-613-00	Air-core, QF Type			
L002	1-407-189-XX	8.2μH			
L003	1-407-159-XX	15μH			
L004	1-407-178-XX	1μH			
L006	1-407-172-XX	180μH			
L007	1-407-169-XX	100μH			
L008	1-407-184-XX	3.3μH			
L009	1-407-180-XX	1.5μH			
L015	1-407-158-XX	12μH			
P001	1-526-575-00	Socket, plug			
⇒ Q002	8-723-302-00	2SK43-2			
⇒ Q003	8-722-383-40	2SK23A-834			
⇒ Q004	8-729-663-47	2SC1364			
⇒ Q005	8-760-413-10	2SC1475			
⇒ Q006	8-729-663-47	2SC1364			
R029	1-246-979-00	1.2	1/8W	carbon (nonflammable)	
R035	1-206-686-00	8.2k	2W	metal oxide (nonflammable)	
R041	1-211-930-00	33	1/8W	carbon (nonflammable)	
R053	1-247-032-00	68	1/8W	carbon (nonflammable)	
RV001	1-224-645-XX	10k, adjustable; 112V ADJ			
T001	1-409-213-00	VIFT-T2			
T002	1-409-318-00	Trap-2			
T003	1-409-319-00	Trap-3			
T004	1-404-117-00	VIFT-1			
T005	1-404-046-00	VIFT-2			
T006	1-403-731-00	VIFT-3			
T007	1-409-262-00	VIFT-7			
T031	1-446-295-00	DC-converter			
T041	1-403-360-00	SIFT-1			
T042	1-403-871-00	SIFT-2			
T051	1-403-904-00	AFT-1			
T052	1-403-905-00	AFT-2			

LA-1 BOARD

♦	1-601-146-00	LA-1 Board	E-305
PL501	1-518-390-00	Lamp, pilot; FAST PLAY	E-304
S501	1-552-412-00	Keyboard, FAST PLAY	E-306

LA-3 BOARD

♦	1-601-148-00	LA-3 Board	E-160
♦ CN501	1-508-734-00	3P Connector	
D501	8-719-812-41	TLR124	
S501	1-552-412-00	Keyboard, PROGRAM SELECT	E-163
S502	1-516-778-XX	Slide, RECORD MODE	E-162

LF-9 BOARD

♦	1-600-015-00	LF-9 Board	E-209
⚠C101	1-130-060-00	0.1 125V film	

- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
♦ CN101	1-560-033-00	3P Connector	
♦ CN102	1-508-786-00	2P Connector	
⚠ F101	1-532-403-XX	Fuse, 3.15A	
⚠ L101	1-421-225-00	Coil, line filter	
⚠ R101	1-202-723-00	2.2M ½W composition	

PS-9 BOARD

♦	A-6723-134-A	PS-9 Board, complete	E-207
C001	1-123-403-00	4700 25V elect	
C002	1-123-328-00	4.7 25V elect	
C003	1-123-332-00	47 25V elect	
C004	1-108-365-00	0.001 100V mylar	
C005	1-123-351-00	0.47 50V elect	
C006	1-123-319-00	47 16V elect	
C007	1-123-404-00	10000 25V elect	
C008, 009	1-123-319-00	47 16V elect	
C015	1-123-348-00	470 35V elect	
C017	1-123-350-00	2200 35V elect	
C018	1-123-316-00	10 16V elect	
C019	1-123-320-00	100 16V elect	
C020–023	1-102-050-00	0.01 500V	
♦ CN001	1-508-742-00	3P Connector	
♦ CN002	1-508-744-00	10P Connector	
♦ CN003	1-508-797-00	4P Connector	
♦ CN005	1-508-766-00	4P Connector	
⇒⚠ D001	8-719-941-13	M4B41-13	
⚠ D002	8-719-901-13	M4B31-13	
D006	8-719-815-55	1S1555	
D007	8-719-162-07	RD6.2E	
D008	8-719-815-55	1S1555	
D009, 010	8-719-200-02	10E2	
D012	8-719-113-07	RD13E	
D013	8-719-815-55	1S1555	
⚠ F001	1-532-348-XX	Fuse, 2.5A	
⚠ F002	1-532-349-00	Fuse, 4A	
⇒ Q001–003	8-729-663-47	2SC1364	
⇒ Q005, 006	8-729-663-47	2SC1364	
⇒ Q009	8-729-663-47	2SC1364	

Ref. No.	Part No.	Description	Remark
R015	1-212-361-00	1.2 1W metal oxide (nonflammable)	
R032	1-212-376-00	22 1W metal oxide (nonflammable)	
R033	1-212-367-00	3.9 1W metal oxide (nonflammable)	
R036	1-212-361-00	1.2 1W metal oxide (nonflammable)	
RV001	1-224-642-XX	1k, adjustable; 12V ADJ	

RP-1 BOARD

♦	A-6711-209-A	RP-1 Board, complete	E-303
C001, 002	1-161-051-00	0.01	
C003	1-101-005-00	0.022	
C004	1-123-318-00	33 16V elect	
C005	1-123-351-00	0.47 50V elect	
C006	1-161-051-00	0.01	
C007	1-123-352-00	1 50V elect	
C009	1-101-006-00	0.047	
C010	1-161-051-00	0.01	
C011	1-123-352-00	1 50V elect	
C013	1-101-006-00	0.047	
C014	1-161-051-00	0.01	
C015–017	1-161-494-00	0.022	
C018	1-131-371-00	10 16V tantalum	
C020	1-123-353-00	2.2 50V elect	
C021	1-161-047-00	0.0047	
C022, 023	1-101-886-00	62p	
C024	1-123-316-00	10 16V elect	
C025	1-161-494-00	0.022	
C026	1-108-619-00	0.0027 100V mylar	
C027	1-161-319-00	470p	
C028	1-161-271-00	100p	
C029	1-161-319-00	470p	
C030	1-161-051-00	0.01	
C031	1-108-619-00	0.0027 100V mylar	
C032	1-131-371-00	10 16V tantalum	
C033	1-161-317-00	330p	
C034, 035	1-161-494-00	0.022	
♦ CN001	1-508-797-00	4P Connector	
♦ CN002	1-508-845-00	6P Connector	
♦ CN003	1-508-744-00	10P Connector	

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Ref. No.	Part No.	Description			Remark
♦ CN004	1-508-847-00	4P Connector			
D001–008	8-719-815-55	1S1555			
IC001	8-751-340-00	CX134A			
L001	1-407-157-XX	10μH			
L002, 003	1-408-158-00	6.8mH			
L004, 005	1-407-158-XX	12μH			
L006	1-407-706-00	120μH			
L007	1-407-496-00	2.2mH			
L008	1-407-195-XX	1mH			
L009, 010	1-408-029-00	0.56μH			
LV001	1-407-286-00	Inductor, variable			
⇒ Q001	8-729-663-47	2SC1364			
⇒ Q002	8-729-612-77	2SA1027R			
⇒ Q003	8-729-612-77	2SA1027R			
⇒ Q004	8-729-663-47	2SC1364			
Q005	8-724-375-01	2SC403C			
⇒ Q006	8-729-663-47	2SC1364			
⇒ Q007, 008	8-765-422-00	2SK152-2			
⇒ Q009–011	8-729-663-47	2SC1364			
R001	1-247-028-00	8.2	1/8W	carbon (nonflammable)	
R013	1-211-929-00	82	1/8W	carbon (nonflammable)	
R017	1-211-421-00	39	1/8W	carbon (nonflammable)	
R034	1-247-028-00	8.2	1/8W	carbon (nonflammable)	
R051	1-247-028-00	8.2	1/8W	carbon (nonflammable)	
RV001	1-224-642-XX	1k, adjustable; Y REC CURRENT			
RV002	1-224-644-XX	3.3k, adjustable; REC f RESP			
RV005,006	1-224-642-XX	1k, adjustable; PB CH B Q/PB CH A Q,			
RV007	1-224-643-XX	2.2k, adjustable; CH BALANCE			
RV008	1-224-644-XX	4.7k, adjustable; DROP OUT COMP			
T001, 002	1-427-455-00	RFT			

SA-5 BOARD

♦	A-6713-088-A	SA-5 Board, complete	E-603

Ref. No.	Part No.	Description			Remark
C001	1-123-316-00	10	16V	elect	
C002, 003	1-108-381-00	0.022	100V	mylar	
C004	1-108-385-00	0.047	100V	mylar	
C005	1-161-323-00	0.001			
C006	1-101-006-00	0.047			
C007, 008	1-131-369-00	4.7	16V	tantalum	
C009	1-161-021-00	0.047			
C010	1-131-345-00	0.47	35V	tantalum	
C011	1-130-200-00	0.047		film	
C012	1-108-368-00	0.0018	100V	mylar	
C013	1-130-201-00	0.068		film	
C014	1-130-200-00	0.047		film	
C015	1-130-199-00	0.01		film	
C016	1-101-006-00	0.047			
C017	1-108-385-00	0.047	100V	mylar	
C018	1-108-365-00	0.001	100V	mylar	
C019, 020	1-131-369-00	4.7	16V	tantalum	
C021	1-101-006-00	0.047			
C022	1-123-307-00	100	10V	elect	
C024	1-101-006-00	0.047			
C025, 026	1-131-369-00	4.7	16V	tantalum	
C027	1-123-328-00	4.7	25V	elect	
C028	1-131-347-00	1	35V	tantalum	
C029	1-101-006-00	0.047			
C030	1-131-345-00	0.47	35V	tantalum	
C031	1-101-003-00	0.0047			
C032	1-123-351-00	0.47	50V	elect	
C033	1-123-352-00	1	50V	elect	
C034	1-161-047-00	0.047			
C035	1-161-323-00	0.001			
C036	1-123-305-00	33	10V	elect	
C038	1-131-345-00	0.47	35V	tantalum	
C039	1-131-346-00	0.68	35V	tantalum	
C040	1-131-344-00	0.33	35V	tantalum	
C041	1-161-025-00	0.1			
C042	1-161-051-00	0.01			
C043	1-123-320-00	100	16V	elect	
C044	1-101-006-00	0.047			
C045	1-123-351-00	0.47	50V	elect	
C046	1-130-535-00	0.15		polyethylene	
C047	1-161-323-00	0.001			
C048	1-130-201-00	0.068		polyethylene	
C049	1-123-320-00	100	16V	elect	
C051	1-123-316-00	10	16V	elect	

• Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Ref. No.	Part No.	Description			Remark
C061, 062	1-131-361-00	2.2	20V	tantalum	
C063	1-101-006-00	0.047			
C064	1-123-320-00	100	16V	elect	
C065	1-123-317-00	22	16V	elect	
C066	1-131-345-00	0.47	35V	tantalum	
C067	1-123-352-00	1	50V	elect	
C068	1-130-200-00	0.047		film	
C069	1-130-224-00	0.015		film	
C074	1-123-328-00	4.7	25V	elect	
C075	1-101-006-00	0.047			
C076	1-161-021-00	0.047			
C077	1-101-001-00	0.001			
C078	1-123-353-00	2.2	50V	elect	
C079	1-123-328-00	4.7	25V	elect	
C080	1-131-361-00	2.2	20V	tantalum	
C082	1-123-317-00	22	16V	elect	
C083	1-123-328-00	4.7	25V	elect	
C084	1-123-316-00	10	16V	elect	
C086, 087	1-123-316-00	10	16V	elect	
C088	1-101-006-00	0.047			
C089	1-123-316-00	10	16V	elect	
C090	1-101-004-00	0.01			
C091	1-123-354-00	3.3	50V	elect	
C092	1-123-316-00	10	16V	elect	
C300	1-101-059-00	510p			
C301	1-161-317-00	330p			
C302	1-108-792-00	0.001		mylar	
C303	1-123-318-00	33	16V	elect	
C304	1-123-352-00	1	50V	elect	
C306	1-123-295-00	100	6.3V	elect	
C307	1-123-316-00	10	16V	elect	
C308	1-123-319-00	47	16V	elect	
C309	1-161-271-00	100p			
C310	1-161-323-00	0.001			
C311	1-123-316-00	10	16V	elect	
C312	1-123-320-00	100	16V	elect	
C313	1-123-328-00	4.7	25V	elect	
C314	1-123-311-00	1000	10V	elect	
C315	1-108-624-00	0.0068	100V	mylar	
C316	1-108-383-00	0.033	100V	mylar	
C317	1-108-387-00	0.068	100V	mylar	
C318	1-108-365-00	0.001	100V	mylar	
C319	1-108-804-00	0.01		mylar	
C320	1-108-589-00	0.027		mylar	
C321	1-161-323-00	0.001			
C322	1-123-352-00	1	50V	elect	
C323	1-108-377-00	0.01	100V	mylar	
C324, 325	1-123-319-00	47	16V	elect	
C326	1-161-263-00	22p			
C327, 328	1-123-316-00	10	16V	elect	
C329	1-108-623-00	0.0056	100V	mylar	
C330	1-123-316-00	10	16V	elect	
C331	1-161-269-00	68p			
C332	1-123-328-00	4.7	25V	elect	
C333	1-161-327-00	0.033			
C334	1-123-319-00	47	16V	elect	
C335	1-123-320-00	100	16V	elect	
C336	1-123-317-00	22	16V	elect	
C337	1-101-006-00	0.047			
C338	1-123-318-00	33	16V	elect	
C339	1-123-316-00	10	16V	elect	
C340	1-161-272-00	120p			
C341	1-123-316-00	10	16V	elect	
C342	1-108-365-00	0.001	100V	mylar	
C343	1-161-316-00	270p			
C344	1-107-166-00	62p	500V	mica	
C345	1-108-583-00	0.015		mylar	
C346	1-108-591-00	0.033		mylar	
C347	1-129-709-00	0.0039	630V	polyethylene	
C348	1-108-383-00	0.033	100V	mylar	
C349	1-108-381-00	0.022	100V	mylar	
C350	1-123-319-00	47	16V	elect	
C351	1-123-320-00	100	16V	elect	
C352	1-102-973-00	100p			
C501, 502	1-131-348-00	1.5	35V	tantalum	
C503	1-123-319-00	47	16V	elect	
♦ CN001	1-508-910-00	12P Connector			
♦ CN002	1-508-742-00	3P Connector			
♦ CN004	1-508-742-00	3P Connector			
♦ CN007	1-508-743-00	5P Connector			
♦ CN008	1-508-846-00	8P Connector			
♦ CN009	1-508-742-00	3P Connector			
♦ CN010	1-508-849-00	8P Connector			
♦ CN011	1-508-734-00	3P Connector			
D001–004	8-719-815-55	1S1555			

• Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Ref. No.	Part No.	Description	Remark
D005	8-719-162-07	RD6.2E	
D006	8-719-815-55	1S1555	
D011–019	8-719-815-55	1S1555	
D021, 022	8-719-815-55	1S1555	
D026	8-719-815-55	1S1555	
D028	8-719-815-55	1S1555	
D030–032	8-719-815-55	1S1555	
D033	8-719-931-13	EQB01-13	
D034	8-719-815-55	1S1555	
D061	8-719-815-80	1S1587	
D062–070	8-719-815-55	1S1555	
D501–503	8-719-815-55	1S1555	
IC001	8-751-860-00	CX186	
IC002	8-751-430-00	CX143A	
IC004	8-759-240-11	TC4011BP	
IC005	8-759-240-27	TC4027BP	
L001	1-407-157-XX	10μH	
L061	1-407-718-00	1.2mH	
L062, 063	1-407-506-00	15mH	
L064	1-407-195-XX	1mH	
LV061	1-407-286-00	Inductor, variable DUB BIAS	
LV062	1-407-240-00	Inductor, variable BIAS TRAP	
Q001,	8-729-612-77	2SA1027R	
⚠⇒ Q002	8-729-612-77	2SA1027R	
⇒ Q003, 004	8-729-663-47	2SC1364	
⇒ Q005	8-729-612-77	2SA1027R	
⇒ Q006	8-729-663-47	2SC1364	
⇒ Q007	8-729-612-77	2SA1027R	
⇒ Q008	8-729-663-47	2SC1364	
⇒ Q010, 011	8-729-663-47	2SC1364	
⇒ Q012, 013	8-729-612-77	2SA1027R	
⇒ Q016–021	8-729-663-47	2SC1364	
⇒ Q024–030	8-729-663-47	2SC1364	
⇒ Q031	8-729-612-77	2SA1027R	
⇒ Q032–036	8-729-663-47	2SC1027R	
⇒ Q038–040	8-729-663-47	2SC1364	
⇒ Q041	8-729-612-77	2SA1027R	
⇒ Q043–046	8-729-663-47	2SC1027R	
⇒ Q047	8-729-612-77	2SA1027R	
⇒ Q049, 050	8-729-663-47	2SC1364	
⇒ Q053, 054	8-729-663-47	2SC1364	
⇒ Q055	8-729-612-77	2SA1027R	
⇒ Q056–059	8-729-663-47	2SC1364	
Q061	8-729-663-47	2SC1364	
Q062, 063	8-729-665-47	2SC1362	
Q064	8-729-663-47	2SC1364	
Q065, 066	8-729-663-47	2SC1364	
Q067	8-729-663-47	2SC1364	
Q068	8-729-665-47	2SC1362	
Q069	8-729-663-47	2SC1364	
Q070, 071	8-729-663-47	2SC1364	
Q072	8-760-523-10	2SA772-23	
Q073–075	8-729-663-47	2SC1364	
Q076	8-760-413-10	2SC1475	
⇒ Q078, 079	8-729-612-77	2SA1027R	
⇒ Q501–509	8-729-663-47	2SC1364	
R002	1-246-865-00	62k 1/8W carbon	
R003	1-246-799-00	22k 1/8W carbon	
R004	1-246-806-00	82k 1/8W carbon	
R006	1-246-793-00	6.8k 1/8W carbon	
R009	1-210-830-11	5.1M ¼W composition	
R014	1-214-156-00	10k ¼W film	
R037	1-214-176-00	68k ¼W film	
R039	1-214-177-00	75k ¼W film	
R047	1-214-168-00	33k ¼W film	
R049	1-214-166-00	27k ¼W film	
R073	1-202-472-00	5.1M ¼W composition	
R076	1-214-172-00	47k ¼W film	
R077	1-214-170-00	39k ¼W film	
R103	1-214-176-00	68k ¼W film	
R110	1-214-178-00	82k ¼W film	
R174	1-214-150-00	5.6k ¼W film	
R185	1-214-158-00	12k ¼W film	
R186	1-214-160-00	15k ¼W film	
R228	1-214-149-00	5.1k ¼W film	
R310	1-246-789-00	3.3k 1/8W carbon	
R328	1-246-851-00	4.3k 1/8W carbon	
R507	1-246-852-00	5.1k 1/8W carbon	
R517	1-246-848-00	2.4k 1/8W carbon	
RV001–003	1-224-647-XX	47k, adjustable; PG(B)/PG(A)/LOCK PHASE	
RV004, 005	1-224-253-XX	22k, adjustable; 3H CAP FREE/1H CAP FREE	
RV006	1-224-254-XX	47k, adjustable; TRACON	
RV007	1-224-644-XX	4.7k, adjustable; SPEED DET	
RV008	1-224-644-XX	3.3k, adjustable; DRUM FREE	
RV009–011	1-224-254-XX	47k, adjustable; X3 NOISE/X3 CAP FREE/2H CAP FREE	

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
RV061–063	1-224-646-XX	22k, adjustable; PB EQ/REC LEVEL/PB LEVEL	
RV064	1-226-497-00	100k, variable; TRACKING	
RV065	1-224-256-XX	220k, adjustable; REC BIAS	
RV501, 502	1-224-252-XX	10k, adjustable; CUE/REVIEW	
S001	1-552-836-00	Slide; REC/PB	
S002	1-552-835-00	Slide; REC/PB	
S003	1-552-617-00	Miniature; DUB + REC	
S004	1-552-821-00	Slide; 1H/2H + 3H	
T061	1-405-670-00	Transformer, OSC	

SW-3 BOARD

♦	1-601-149-00	SW-3 Board	
♦ CN401, 402	1-508-742-00	3P Connector	
S401–404	1-553-035-00	Lever, EJECT/REW/PLAY/FF	

SY-12 BOARD

♦	A-6717-153-A	SY-12 Board, complete			E-310
C001	1-161-185-00	0.01			
C002	1-123-352-00	1	50V	elect	
C003	1-161-185-00	0.01			
C004	1-123-353-00	2.2	50V	elect	
C005, 006	1-123-352-00	1	50V	elect	
C007	1-129-794-00	0.0033	100V	film	
C008–010	1-123-352-00	1	50V	elect	
C011	1-129-794-00	0.0033	100V	film	
C012	1-123-317-00	22	16V	elect	
C013	1-161-185-00	0.01			
C014	1-123-319-00	47	16V	elect	
C015	1-123-320-00	100	16V	elect	
C016	1-123-307-00	100	10V	elect	
C017	1-123-317-00	22	16V	elect	
C018, 019	1-123-328-00	4.7	25V	elect	
C020	1-161-021-00	0.047			
C021–023	1-161-089-00	0.01	100V		
C024, 025	1-123-354-00	3.3	50V	elect	
♦ CN001	1-508-846-00	8P Connector			
♦ CN002	1-508-848-00	6P Connector			

Ref. No.	Part No.	Description	Remark
♦ CN003	1-508-744-00	10P Connector	
♦ CN004, 005	1-508-910-00	12P Connector	
♦ CN006	1-508-736-00	10P Connector	
♦ CN007	1-508-910-00	12P Connector	
♦ CN008	1-508-847-00	4P Connector	
♦ CN009–012	1-508-742-00	3P Connector	
♦ CN013, 014	1-508-734-00	3P Connector	
⇒ D001	8-719-815-55	1S1555	
D002	8-719-815-55	1S1555	
⇒ D003	8-719-815-55	1S1555	
D004–006	8-719-815-55	1S1555	
⇒ D007, 008	8-719-200-02	10E2	
⇒ D009	8-719-931-08	EQB01–08	
D010	8-719-815-55	1S1555	
⇒ D011–015	8-719-200-02	10E2	
D016–018	8-719-815-55	1S1555	
⇒ D019	8-719-200-02	10E2	
D020, 021	8-719-815-55	1S1555	
D024	8-719-200-02	10E2	
D025	8-719-815-55	1S1555	
D026	8-719-200-02	10E2	
D027–029	8-719-815-55	1S1555	
D030	8-719-200-02	10E2	
D031	8-719-200-10	10E10P	
D032–034	8-719-815-55	1S1555	
⇒ D035	8-719-931-13	EQB01–13	
⇒ D036	8-719-931-10	EQB01–10	
D038	8-719-815-55	1S1555	
⇒ D039, 040	8-719-815-55	1S1555	
IC001	8-759-146-37	μPD546C037	
IC002, 003	8-743-420-00	BX342	
IC004	8-759-140-01	μPD4001C	
L001, 002	1-407-510-00	33mH	
L003	1-405-876-00	OSC	
⇒ Q001, 002	8-729-612-77	2SA1027R	
⇒ Q003	8-729-663-47	2SC1364	
Q004	8-729-663-47	2SC1364	
Q005	8-729-316-12	2SC1061	
⚠ Q006	8-760-335-10	2SC1474	
Q007	8-729-663-47	2SC1364	
Q008	8-760-335-10	2SC1474	
⚠ Q009	8-760-335-10	2SC1474	

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Ref. No.	Part No.	Description	Remark
Q010	8-729-663-47	2SC1364	
Q011	8-760-335-10	2SC1474	
⚠Q012	8-760-335-10	2SC1474	
Q013	8-729-663-47	2SC1364	
Q014, 015	8-760-335-10	2SC1474	
Q016	8-729-663-47	2SC1364	
Q017	8-760-335-10	2SC1474	
⚠Q018	8-760-335-10	2SC1474	
⇒Q019–023	8-729-663-47	2SC1364	
⚠Q024	8-729-612-77	2SA1027R	
⚠Q025	8-729-316-12	2SC1061	
⇒Q026	8-729-663-47	2SC1364	
⚠Q027	8-763-113-00	2SC1761	
⇒Q028	8-729-612-77	2SA1027R	
⚠Q029	8-729-663-47	2SC1364	
⚠Q030	8-763-113-00	2SC1761	
⇒Q031–033	8-729-663-47	2SC1364	
⚠Q034, 035	8-760-335-10	2SC1474	
⇒Q036–038	8-729-663-47	2SC1364	
R008	1-231-435-00	Array	
R014	1-231-434-00	Array	
⚠R015–019	1-211-929-00	82 1/8W carbon (nonflammable)	
R020	1-231-434-00	Array	
R021	1-231-435-00	Array	
R040	1-212-356-00	0.47 1W metal oxide (nonflammable)	
R046	1-211-929-00	82 1/8W carbon (nonflammable)	
⚠R053, 054 062	1-246-981-00	4.7 1/8W carbon (nonflammable)	

SY-13 BOARD

♦	A-6717-155-A	SY-13 Board, complete	E-308
C502	1-123-352-00	1 50V elect	
C505	1-123-351-00	0.47 50V elect	
C508	1-123-379-00	47 16V elect	
C509	1-123-354-00	3.3 50V elect	
C510	1-161-181-00	0.0047	
C511	1-123-353-00	2.2 50V elect	
C512	1-102-824-00	470p	
C513	1-123-353-00	2.2 50V elect	
C514	1-102-824-00	470p	
♦ CN501	1-508-735-21	5P Connector	
♦ CN502	1-508-847-00	4P Connector	
♦ CN503	1-508-734-00	3P Connector	
♦ CN504	1-508-734-21	3P Connector	
D501–504	8-719-815-55	1S1555	
IC501	8-759-240-13	TC4013BP	
Q501–512	8-729-663-47	2SC1364	

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

RC-5 BOARD

♦	1-601-978-00	RC-5 Board	
D6901	8-719-812-42	TLY124	
D6902	8-719-812-41	TLR124	
S6901–S6904	1-552-412-00	Keyboard	

TB-1 BOARD

♦	1-601-960-00	TB-1 Board	E-161
C001	1-108-365-00	0.001 100V mylar	
C002	1-123-320-00	100 16V elect	
C003	1-108-843-00	0.033 mylar	
♦ CN001	1-508-742-00	3P Connector	
⇒D001	8-719-931-08	EQB01–08	
⇒D002	8-719-331-10	UF1A	
⇒D003	8-719-151-07	RD5.1E-B	
L001	1-407-716-00	820μH	
⇒Q001	8-729-663-47	2SC1364	
⇒Q002	8-760-413-10	2SC1475	

TR-1 BOARD

♦	1-600-038-00	TR-1 Board	E-208
⚠Q6301	8-729-331-53	2SC2315	

TR-2 BOARD

♦	1-600-038-00	TR-2 Board	
⚠Q6311	8-729-331-53	2SC2315	

• Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

TR-4 BOARD

Ref. No.	Part No.	Description	Remark
♦	1-602-174-00	TR-4 Board	E-211
Q6321	8-729-331-53	2SC2315	

TS-6 BOARD

Ref. No.	Part No.	Description	Remark
♦	A-6728-104-A	TS-6 Board	E-159
C101	1-123-352-00	1 50V elect	
C102	1-123-316-00	10 16V elect	
C103	1-121-806-00	10 16V elect (nonpolarized)	
D101–128	8-719-815-55	1S1555	
NL101–114	1-519-194-00	Lamp, neon	
⇒ Q101	8-729-663-47	2SC1364	
S115–128	1-552-774-00	Push, CHANNEL SELECT	
S129	1-516-226-00	Slide, AFT	
	1-226-760-00	Preset Unit (including RV1–14 & S1 – 14)	E-164

TS-7 BOARD

Ref. No.	Part No.	Description	Remark
♦	A-6728-105-A	TS-7 Board	E-165
C001	1-161-016-00	0.018	
C002	1-161-017-00	0.022	
C003	1-161-008-00	0.0039	
C004	1-123-316-00	10 16V elect	
C005	1-123-351-00	0.47 50V elect	
C006	1-161-023-00	0.068	
C007	1-161-013-00	0.01	
C008	1-123-320-00	100 16V elect	
C009–012	1-101-888-00	68p	
C013	1-161-321-00	680p	
♦ CN001	1-508-736-00	10P Connector	
D002, 003	8-719-815-55	1S1555	
D006	8-719-162-07	RD6.2E	
D007–017	8-719-815-55	1S1555	
IC001	8-719-113-63	μPC1363C	
IC002	8-759-140-29	μPD4029C	
IC003	8-759-240-11	TC4011BP	
Q001–004	8-729-902-11	2SC2021	
Q005	8-729-978-62	2SA786	
Q006, 007	8-729-902-11	2SC2021	

TU-9 BOARD

Ref. No.	Part No.	Description	Remark
♦	A-6721-039-A	TU-9 Board, complete	E-151
C101, 102	1-108-638-00	0.1 100V mylar	
C103–105	1-123-329-00	10 25V elect	
C106	1-123-318-00	33 16V elect	
D101	8-719-815-55	1S1555	
L101	1-407-165-XX	47μH	
⇒ Q101–103	8-729-612-77	2SA1027R	
⇒ Q104, 105	8-729-663-47	2SC1364	
RV101, 102	1-224-642-XX	1k, adjustable; VHF AGC/UHF AGC	

YC-4 BOARD

Ref. No.	Part No.	Description	Remark
♦	A-6711-211-A	YC-4 Board, complete	
C001	1-123-307-00	100 10V elect	
C002	1-161-051-00	0.01	
C003	1-161-494-00	0.022	
C004	1-161-021-00	0.047	
C005	1-131-343-00	0.22 35V tantalum	
C006	1-161-013-00	0.01	
C007	1-102-959-00	22p	
C009	1-102-962-00	30p	
C010	1-161-021-00	0.047	
C012	1-161-021-00	0.047	
C013–016	1-161-051-00	0.01	
C017	1-161-005-00	0.0022	
C018	1-161-039-00	0.001	
C019	1-123-295-00	100 6.3V elect	
C020	1-161-051-00	0.01	
C021	1-123-319-00	47 16V elect	
C022	1-161-051-00	0.01	

• Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Ref. No.	Part No.	Description			Remark
C023	1-123-319-00	47	16V	elect	
C024	1-102-529-00	100p			
C025	1-161-017-00	0.022			
C026	1-161-006-00	0.0027			
C027	1-161-004-00	0.0018			
C028	1-123-316-00	10	16V	elect	
C029	1-161-271-00	100p			
C030	1-161-272-00	120p			
C031	1-123-296-00	220	6.3V	elect	
C032	1-123-352-00	1	50V	elect	
C033	1-161-255-00	4.7p			
C034	1-161-262-00	18p			
C035	1-123-307-00	100	10V	elect	
C036	1-102-953-00	18p			
C037	1-102-808-00	6p			
C038	1-123-296-00	220	6.3V	elect	
C039	1-161-339-00	24p			
C040	1-161-317-00	330p			
C041	1-123-319-00	47	16V	elect	
C042	1-123-307-00	100	10V	elect	
C044	1-123-306-00	47	10V	elect	
C045	1-161-051-00	0.01			
C046	1-102-980-00	270p			
C047	1-101-059-00	510p			
C048	1-102-980-00	270p			
C049	1-102-820-00	330p			
C050	1-123-296-00	220	6.3V	elect	
C051	1-161-051-00	0.01			
C052	1-123-295-00	100	6.3V	elect	
C053	1-123-319-00	47	16V	elect	
C054	1-123-311-00	1000	10V	elect	
C056	1-123-307-00	100	10V	elect	
C058	1-123-319-00	47	16V	elect	
C059	1-161-259-00	10p			
C060, 061	1-102-965-00	39p			
C062	1-161-256-00	5.6p			
C063	1-161-269-00	68p			
C064	1-161-268-00	56p			
C065	1-161-315-00	220p			
C066	1-161-327-00	0.0033			
C067, 068	1-123-318-00	33	16V	elect	
C069	1-161-021-00	0.047			
C070	1-161-051-00	0.01			
C071	1-161-013-00	0.01			
C072, 073	1-123-319-00	47	16V	elect	
C074	1-161-013-00	0.01			
C075	1-161-025-00	0.1			
C076	1-123-316-00	10	16V	elect	
C077	1-123-305-00	33	10V	elect	
C078	1-161-264-00	27p			
C079	1-102-530-00	120p			
C080	1-123-320-00	100	16V	elect	
C081	1-161-051-00	0.01			
C082	1-102-962-00	30p			
C083	1-161-051-00	0.01			
C084	1-102-935-00	2p			
C085	1-161-363-00	11p			
C086, 087	1-161-051-00	0.01			
C088	1-123-353-00	2.2	50V	elect	
C089	1-161-494-00	0.022			
C090	1-131-343-00	0.22	35V	tantalum	
C091	1-161-322-00	820p			
C092	1-123-328-00	4.7	25V	elect	
C093	1-161-013-00	0.01			
C094	1-161-051-00	0.01			
C095	1-161-013-00	0.01			
C096, 097	1-161-271-00	100p			
C098	1-102-117-00	820p			
C099	1-161-051-00	0.01			
C100, 101	1-123-351-00	0.47	50V	elect	
C104	1-102-824-00	470p			
C105	1-123-351-00	0.47	50V	elect	
C106	1-123-316-00	10	16V	elect	
C107, 108	1-161-321-00	680p			
C109	1-102-962-00	30p			
C110	1-123-316-00	10	16V	elect	
C111	1-123-319-00	47	16V	elect	
C112	1-161-013-00	0.01			
C113	1-108-369-00	0.0022	100V	mylar	
C114	1-102-116-00	680p			
C115	1-108-624-00	0.0068	100V	mylar	
C116	1-123-351-00	0.47	50V	elect	
C117	1-161-010-00	0.0056			
C118	1-102-820-00	330p			
C119	1-102-973-00	100p			
C120	1-102-816-00	120p			
C121	1-161-051-00	0.01			

Ref. No.	Part No.	Description			Remark
C122	1-102-945-00	8p			
C123	1-161-051-00	0.01			
C124	1-161-271-00	100p			
C125	1-123-354-00	3.3	50V	elect	
C126	1-123-307-00	100	10V	elect	
C127	1-161-051-00	0.01			
C128	1-123-319-00	47	16V	elect	
C129	1-123-328-00	4.7	25V	elect	
C130	1-161-323-00	0.001			
C131	1-161-047-00	0.0047			
C132	1-161-271-00	100p			
C133, 134	1-131-361-00	2.2	20V	tantalum	
C135	1-123-307-00	100	10V	elect	
C137	1-123-307-00	100	10V	elect	
C139, 140	1-161-051-00	0.01			
C141	1-123-352-00	1	50V	elect	
C142	1-123-306-00	47	10V	elect	
C143	1-102-980-00	270p			
C146	1-102-821-00	360p			
C147	1-102-824-00	470p			
C148	1-101-059-00	510p			
C149	1-161-021-00	0.047			
C150	1-102-976-00	180p			
C152	1-102-821-00	360p			
C153	1-161-330-00	0.01			
C154	1-101-059-00	510p			
C155	1-123-316-00	10	16V	elect	
C157	1-102-972-00	91p			
C158	1-161-342-00	43p			
C159	1-102-816-00	120p			
C160	1-123-307-00	100	10V	elect	
C161	1-123-316-00	10	16V	elect	
C162	1-161-317-00	330p			
C163	1-102-976-00	180p			
C164	1-161-051-00	0.01			
C165	1-123-319-00	47	16V	elect	
C166	1-102-963-00	33p			
C167	1-102-981-00	300p			
C168	1-102-820-00	330p			
C169	1-123-306-00	47	10V	elect	
C170	1-123-322-00	330	16V	elect	
C171	1-102-977-00	200p			
C172	1-102-820-00	330p			
C174	1-108-559-00	0.0015		mylar	
C176	1-161-342-00	43p			
C177	1-161-268-00	56p			
C178	1-102-965-00	39p			
C180	1-123-351-00	0.47	50V	elect	
C181	1-123-316-00	10	16V	elect	
C183	1-130-224-00	0.015		polyethylene	
C184	1-161-263-00	22p			
C186	1-161-013-00	0.01			
C187	1-161-257-00	6.8p			
C188	1-102-966-00	43p			
C189	1-161-317-00	330p			
C190–192	1-161-051-00	0.01			
C193	1-102-978-00	220p			
C195	1-161-267-00	47p			
C196	1-123-352-00	1	50V	elect	
C198	1-161-013-00	0.01			
C199	1-101-884-00	56p			
C200	1-161-013-00	0.01			
C201	1-123-352-00	1	50V	elect	
C202	1-131-344-00	0.33	35V	tantalum	
C203	1-123-316-00	10	16V	elect	
C204	1-161-021-00	0.047			
C205–208	1-123-306-00	47	10V	elect	
C209	1-161-323-00	0.001			
C210, 211	1-161-051-00	0.01			
C212, 213	1-123-318-00	33	16V	elect	
C214	1-161-013-00	0.01			
C215	1-123-316-00	10	16V	elect	
C216	1-123-307-00	100	10V	elect	
C217	1-102-951-00	15p			
C218	1-161-013-00	0.01			
C219	1-161-021-00	0.047			
♦ CN001	1-508-744-00	10P Connector			
♦ CN002	1-508-797-00	4P Connector			
♦ CN003	1-508-845-00	6P Connector			
♦ CN005	1-508-846-00	8P Connector			
♦ CN006	1-508-744-00	10P Connector			
♦ CN008	1-508-736-00	10P Connector			
♦ CN009	1-508-735-00	5P Connector			
CNJ001,002	1-507-588-11	Jack, VIDEO IN/VIDEO OUT			
CNJ003–CNJ005	1-507-251-XX	Jack, AUDIO IN/MIC/AUDIO OUT			

- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Ref. No.	Part No.	Description	Remark
D001–007	8-719-815-55	1S1555	
D009–011	8-719-815-55	1S1555	
D013–018	8-719-815-55	1S1555	
D023	8-719-815-55	1S1555	
D027–034	8-719-815-55	1S1555	
D036	8-719-815-55	1S1555	
DL001	1-415-065-00	Delay Line	
DL002	1-415-159-00	Delay Line (1H)	
IC001	8-751-870-00	CX187	
IC002	8-751-880-00	CX188	
⇒ IC003	8-751-960-00	CX196A	
IC004	8-759-684-78	M58478P	
IC005	8-751-300-00	CX130	
IC006	8-751-350-00	CX135	
IC007	8-743-580-00	BX358	
IC008	8-743-640-00	BX364	
L001	1-407-159-XX	15μH	
L002, 003	1-407-696-00	18μH	
L004	1-407-718-00	1.2mH	
L005	1-407-171-XX	150μH	
L006	1-407-172-XX	180μH	
L007	1-407-709-00	220μH	
L008	1-407-172-XX	180μH	
L009	1-407-189-XX	8.2μH	
L010	1-407-158-XX	12μH	
L011	1-407-162-XX	27μH	
L012	1-407-569-00	10μH	
L013	1-407-169-XX	100μH	
L014	1-407-706-00	120μH	
L015	1-407-169-XX	100μH	
L016	1-407-167-XX	68μH	
L017	1-407-169-XX	100μH	
L018	1-407-171-XX	150μH	
L019	1-407-747-11	56μH	
L020	1-407-165-XX	47μH	
L021	1-407-709-00	220μH	
L022	1-407-167-XX	68μH	
L023	1-407-503-00	8.2mH	
L024	1-407-168-XX	82μH	
L025	1-407-191-XX	470μH	
L026	1-407-157-XX	10μH	
L027, 028	1-407-164-XX	39μH	
L029	1-407-706-00	120μH	
L030	1-407-161-XX	22μH	
L032	1-407-169-XX	100μH	
L033	1-407-172-XX	180μH	
L034	1-407-171-XX	150μH	
L035	1-407-168-XX	82μH	
L036	1-407-189-XX	8.2μH	
L037	1-407-171-XX	150μH	
L038	1-407-164-XX	39μH	
L041	1-407-163-XX	33μH	
L042	1-407-168-XX	82μH	
⇒ Q001–004	8-729-612-77	2SA1027R	
Q005	8-724-375-01	2SC403C	
⇒ Q006, 007	8-729-612-77	2SA1027R	
⇒ Q008	8-729-663-47	2SC1364	
Q012	8-724-375-01	2SC403C	
⇒ Q013	8-729-612-77	2SA1027R	
Q014	8-765-222-20	2SC1963	
⇒ Q016	8-729-663-47	2SC1364	
⇒ Q017–019	8-729-663-47	2SC1364	
⇒ Q020	8-729-612-77	2SA1027R	
⇒ Q021, 022	8-729-663-47	2SC1364	
⇒ Q024	8-729-663-47	2SC1364	
⇒ Q025, 026	8-729-612-77	2SA1027R	
⇒ Q027–030	8-729-663-47	2SC1364	
Q033, 034	8-724-375-01	2SC403C	
⇒ Q035, 036	8-729-663-47	2SC1364	
Q037	8-724-375-01	2SC403C	
⇒ Q038	8-729-612-77	2SA1027R	
⇒ Q039–041	8-729-663-47	2SC1364	
⇒ Q043, 044	8-729-612-77	2SA1027R	
Q045	8-724-375-01	2SC403C	
⇒ Q046–048	8-729-612-77	2SA1027R	
⇒ Q049, 050	8-729-663-47	2SC1364	
⇒ Q051	8-729-612-77	2SA1027R	
Q052, 053	8-724-375-01	2SC403C	
⇒ Q054, 055	8-729-663-47	2SC1364	
⇒ Q057	8-729-612-77	2SA1027R	
Q058	8-724-375-01	2SC403C	
⇒ Q059	8-729-663-47	2SC1364	
Q060	8-724-375-01	2SC403C	

Ref. No.	Part No.	Description	Remark
⇒ Q061	8-729-612-77	2SA1027R	
⇒ Q062	8-729-663-47	2SC1364	
Q063	8-724-375-01	2SC403C	
⇒ Q064–067	8-729-663-47	2SC1364	
Q068	8-724-375-01	2SC403C	
⇒ Q069–076	8-729-663-47	2SC1364	
R007	1-202-471-00	4.7M ¼W composition	
R073	1-244-860-00	300 ½W carbon	
R114	1-210-819-00	1.8M ¼W composition	
R242	1-212-705-00	130k ½W film	
RV001,002	1-224-642-XX	1k, adjustable; REC CHROMA/NOI CAN	
RV003	1-224-643-XX	2.2k, adjustable; VIDEO LEVEL	
RV004	1-224-641-XX	470, adjustable; COMB I	
RV005	1-224-643-XX	2.2k, adjustable; PB EMPH	
RV007	1-224-642-XX	1k, adjustable; ACC	
RV008	1-224-646-XX	22k, adjustable; CAR BAL	
RV009	1-224-645-XX	10k, adjustable; VCO	
RV010	1-224-551-00	220k, adjustable; HARD CLAMP	
RV011, 012	1-224-642-XX	1k, adjustable; DARK CLIP/WHITE CLIP	
RV014, 015	1-224-641-XX	470, adjustable; DEVIATION; CARRIER	
RV016	1-224-643-XX	2.2k, adjustable; PEAK AGC	
RV017	1-224-647-XX	47k, adjustable; HALF H SHIFT	
RV018	1-224-645-XX	10k, adjustable; SYNC AGC	
S001	1-552-821-00	Slide, PCM	
S002	1-553-034-00	Slide, CAMERA/TUNER	
T001	1-425-996-00	BPT-7	
T002	1-426-024-00	BPT-6	
T003	1-415-083-00	EQT-1	
T004	1-231-412-00	Filter Block	
T005	1-425-785-31	BAT	
T006	1-411-100-00	BPT-1	
T007	1-411-104-00	BPT-5	
T008	1-425-993-00	BPT	
T009	1-425-992-00	EQT	
X001	1-527-154-00	Crystal, OSC; 3.58MHz	

CHASSIS

C9601,9602	1-101-006-00	0.047	E-167
CN6601	1-561-320-00	Connector, REMOTE	E-607
CN6602, CN6603	1-507-195-21	Jack, CAMERA PAUSE; CONTROL	E-606
⚠ CN9501	1-561-347-00	AC OUTLET	E-605
L9501	1-543-145-00	FWD sensor	E-501
L9502	1-543-145-00	REW sensor	E-302
M9502	8-838-008-00	CAPSTAN MOTOR, BHF-1100D	E-455
PL9501	1-518-393-00	PILOT, POWER	
PL9502	1-518-391-00	PILOT, PAUSE	
PL9503	1-518-392-00	PILOT, RECORD	
S9501	1-552-663-00	Miniature, CASSETTE IN	E-555
S9502	1-552-665-00	Miniature, THREADING END	E-457
S9503	1-553-220-00	Slide, MEMORY	E-309
S9504	1-514-722-XX	Miniature, PAUSE	E-102
S9505	1-552-837-00	RF SELECTOR	E-158
⚠ SL9501	1-454-230-00	Solenoid, STOP	E-101
⚠ SL9502	1-454-216-00	Solenoid, REW/REV	E-554
⚠ SL9503	1-454-215-21	Solenoid, FF/CUE	E-553
⚠ SL9504	1-454-233-00	Solenoid, FWD	E-552
⚠ SL9505	1-454-217-00	Solenoid, PINCH	E-454
⚠ SL9506	1-454-185-21	Solenoid, BRAKE	E-402
⚠ SL9507	1-454-229-00	Solenoid, SELECT	E-401
⚠ T9501	1-446-631-00	Transformer, POWER	E-210
	1-463-264-00	UHF/VHF TUNER, BT-852	E-153
	1-464-094-00	RF MODULATOR, RFU-534A	E-154
	1-536-610-00	ANTENNA TERMINAL	E-155
	1-548-534-00	TAPE COUNTER	E-307
•	1-551-752-00	PIN CABLE	E-156
•	1-551-754-51	PIN CABLE	E-157
⚠	1-551-964-00	POWER CORD	E-601
•	1-555-110-00	PIN CABLE	
•	1-555-112-00	PIN CABLE	

• Items marked "•" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Sony Corporation

© 1980

9-972-049-01

80A0947-1
Printed in Japan

Betamax

VIDEOCASSETTE RECORDER

SL-5600

VOL.2

SPECIFICATIONS

General

Video recording system: Rotary two-head helical scanning

Video signal: EIA standard, NTSC color

Storage temperature: –20°C to +60°C (–4°F to +140°F)

Operating temperature: 5°C to 40°C (41°F to 104°F)

Antenna: 75-ohm external antenna terminal for VHF
300-ohm external antenna terminals for UHF

Channel coverage: VHF channels 2 –13
UHF channels 14 –83

VHF output signal: Channel 3 or 4 (selectable)
75 ohms, unbalanced

Timer: only for recording
Electronic digital timer
12-hour-clock cycle
synchronized with the power frequency

Power requirements: 120V ac ± 10%, 60 Hz ± 0.5%

AC OUTLET: Unswitched max. 400W

Power consumption: 55W

Weight: 16.5kg (36 lb 6 oz)

Dimensions: 495 x 162 x 377 mm (w/h/d)
($19\frac{1}{2}$ x $6\frac{1}{2}$ x $14\frac{7}{8}$ inches)

Video

Input: VIDEO IN: phono-type connector
1.0V(p-p), 75 ohms,
unbalanced, sync negative

Output: VIDEO OUT: phono-type connector
1.0V(p-p), 75 ohms,
unbalanced, sync negative

Signal-to-noise ratio: Better than 45dB

Audio

Input: AUDIO IN: mini jack
100k ohms, –10dB
MIC: mini jack
–60dB, suitable for microphone with 600-ohm impedance

Output: AUDIO OUT: mini jack
Less than 10k ohms, –5dB
(100k ohm load), unbalanced

Frequency response: β II : 50 – 10,000 Hz
β III : 50 – 7,000 Hz

Signal-to-noise ratio: Better than 40dB

Tape transport

Tape speed: β II : 2.0cm/sec., β III : 1.33cm/sec.

Maximum recording time: 180 min. in β II mode, 270 min. in β III mode (with Sony L-750 cassette)

Fast forward time: Within $3\frac{1}{2}$ min. (L-500)

Rewind time: Within $3\frac{1}{2}$ min. (L-500)

Accessories supplied

Betamax videocassette tape
External antenna connector EAC-24 (75-ohm to 300-ohm matching transformer)
External antenna connector EAC-25 (300-ohm to 75-ohm matching transformer)
75-ohm coaxial cable with F-type connectors (2m)
300-ohm ribbon-type lead in (2m)
βetaScan control
Channel number segments

Optional accessories

Extension cable RFC-8
Betamax video cassette tape L-250, L-500, L-750

SONY®

SERVICE MANUAL

INDEX

1. PREPARATION FOR MECHANICAL SECTION CHECK, ADJUSTMENT, AND REPLACEMENT

1-1. Disassembly 1-1
1-2. Notes on Maintenance 1-2
1-3. Operating Recorder Without Cassette Installed 1-3
1-4. Stopping Slack Sensor Operation 1-3
1-5. Tools and Jigs Required 1-4

2. PERIODIC CHECK AND MAINTENANCE

2-1. Maintenance after Repair 2-1
2-2. Periodic Check Items 2-1
2-3. Others 2-2

3. CHECK, ADJUSTMENT, AND, REPLACEMENT PROCEDURES

3-1. Replacement of Video Head Disk Assembly and Eccentricity Adjustment 3-1
3-2. Replacement of Drum Assembly 3-2
3-3. Replacement of Capstan DC motor 3-4
3-4. Replacement and Adjustment of Tension Regulator Arm Plate Assembly and Tension Regulator Band Assembly 3-5
3-4-1. When Tension Regulator Band Assembly is Replaced: 3-5
3-4-2. When Tension Regulator Arm Plate is Replaced: 3-6
3-5. Replacement of Cassette-lift Assembly 3-7
3-6. Adjustment of Reel Table Height 3-7
3-7. Position Adjustment, Pause Solenoid 3-7
3-8. Adjustment of Threading and Unthreading . . . 3-8
3-8-1. Operation Check of Cassette-in Switch 3-8
3-8-2. Position Adjustment of Threading Unit B Assembly and Control Plate 3-8
3-8-3. Position Adjustment of Gear Pulley Hold Arm Assembly 3-9
3-8-4. Adhesion of Brake Shoe 3-9
3-8-5. Clearance Adjustment of Cassette-lift Assembly Arm 3-9
3-8-6. Clearance Adjustment of Ring Arm 3-10
3-8-7. Check of Unthreading Completion 3-10
3-9. Position Adjustment of Lid Opener 3-11
3-10. Replacement and Adjustment of Threading Ring Assembly 3-12
3-11. Position Adjustment of Pinch Roller Solenoid . 3-13
3-11-1. Parallelism Adjustment of Pinch Press Lever . . 3-13
3-11-2. Position Adjustment of Pinch Solenoid 3-14
3-11-3. Position Adjustment of Slack Sensor Operation 3-14
3-12. Stop Solenoid Check Adjustment and Replacement 3-15
3-12-1. Stop Solenoid Check and Adjustment 3-15
3-12-2. Stop Solenoid Replacement 3-15
3-13. Button Switch on Timing Check and Adjustment (in EJECT, PLAY, FF and REW Modes) . . . 3-16
3-14. Button Block Function Check and Replacement 3-16
3-15. Position Adjustment of Threading End Switch 3-17
3-16. Check of Take-up Torque 3-17
3-17. Check of Cassette Eject Torque 3-18
3-18. Check of Brake Torque 3-18
3-18-1. Check of Supply and Take-up Brake Operations 3-19
3-18-2. Check of Supply and Take-up Brake Torque . . 3-19
3-18-3. Check and Adjustment of Soft Brake Torque . 3-20
3-19. Adjustment of FWD Back Tension 3-20
3-20. Adjustment of Tracking 3-20
3-20-1. Adjustment of Tape Path 3-22
3-20-2. Adjustment of Exit Side Tracking after ACE Assembly Replacement 3-23
3-20-3. Audio Head Azimuth Adjustment 3-24
3-20-4. Position Adjustment of ACE Assembly 3-24
3-20-5. Video Head Dihedral Adjustment 3-24
3-21. Function Solenoid Adjustment and Replacement 3-26
3-21-1. SL Solenoid Check and Adjustment 3-26
3-21-2. SL Solenoid Replacement 3-27
3-21-3. Clutch Pulley Block Assembly Replacement . . 3-27
3-21-4. PLAY, FF and REW Solenoid Checks and Adjustments 3-28
3-21-5. PLAY, FF and REW Solenoid Replacements . . 3-29

4. ELECTRICAL ALIGNMENT

4-1. Power Supply Alignment and Check (PS-9 board) 4-2
4-2. System Control Alignment and Check (SY-12 board) 4-2
4-3. Servo System Alignment 4-3
4-3-1. Drum Servo System Alignment 4-3
4-3-2. Capstan Servo System Alignment 4-5
4-3-3. 0.5H Compensation Circuitly Adjustment . . . 4-6
4-4. Video System Alignment (RP-1 & YC-4 boards) 4-7
4-5. Audio System Alignment 4-11
4-6. Tuner Block System Adjustment 4-13

SECTION 1
PREPARATION FOR MECHANICAL SECTION CHECK, ADJUSTMENT, AND REPLACEMENT

1-1. DISASSEMBLY

1. Removal and Re-assembly of Cabinet

(1) Cabinet Removal
Perform procedures ① to ⑥.

(2) Cassette-lift Lid Assembly Removal
Perform procedures ⑦ to ⑨ .

(3) Note on Assembly

(i) When the cassete-lift lid is assembled, there must be a clearance of 1 to 2 mm between the lid and upper case as shown below.

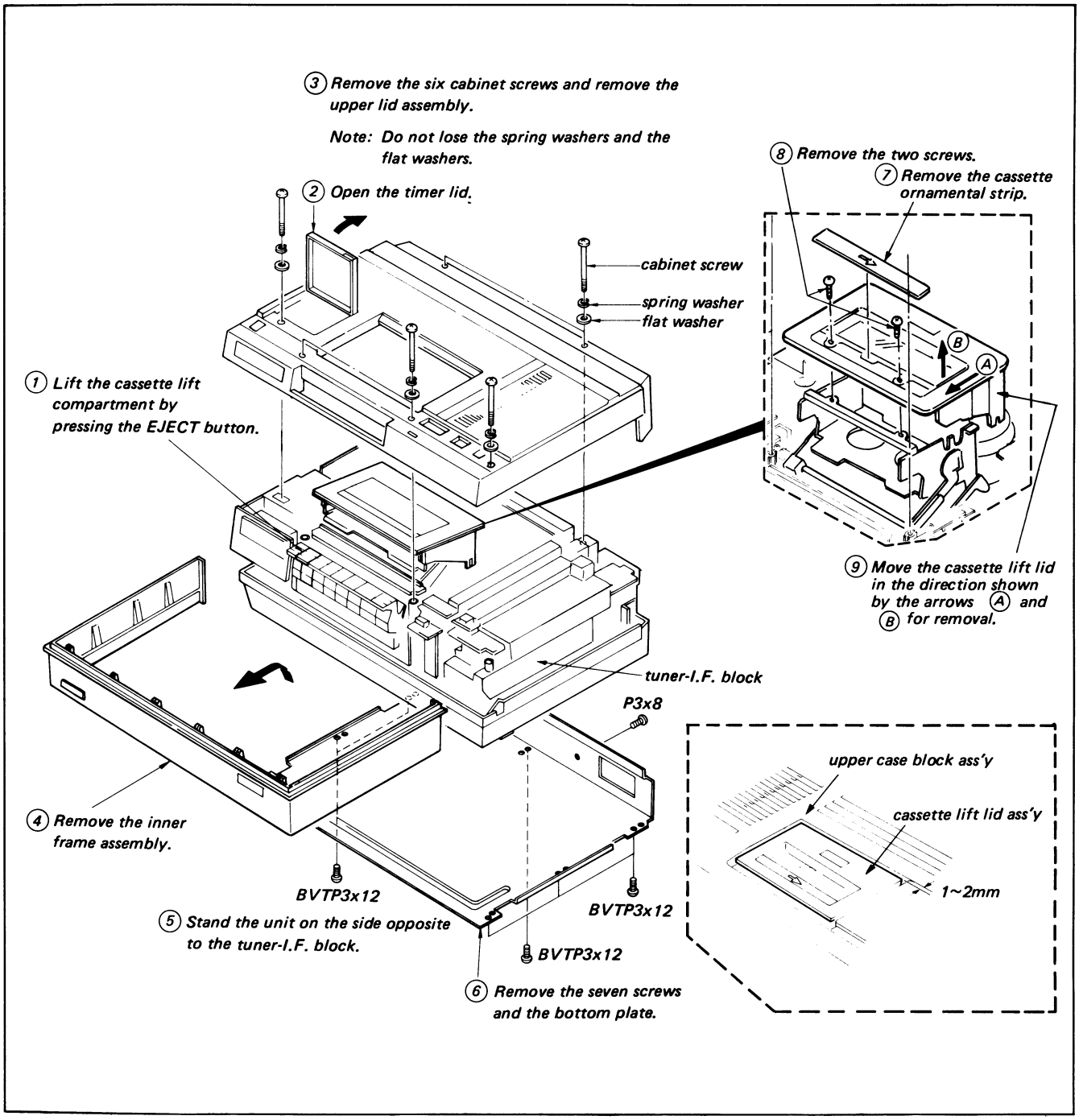

③ Remove the six cabinet screws and remove the upper lid assembly.
Note: Do not lose the spring washers and the flat washers.
② Open the timer lid.
cabinet screw
spring washer
flat washer
⑧ Remove the two screws.
⑦ Remove the cassette ornamental strip.
① Lift the cassette lift compartment by pressing the EJECT button.
B
A
⑨ Move the cassette lift lid in the direction shown by the arrows Ⓐ and Ⓑ for removal.
tuner-I.F. block
P3x8
upper case block ass'y
cassette lift lid ass'y
1~2mm
④ Remove the inner frame assembly.
BVTP3x12
BVTP3x12
⑤ Stand the unit on the side opposite to the tuner-I.F. block.
BVTP3x12
⑥ Remove the seven screws and the bottom plate.

Fig. 1-1. Removal and re-assembly of cabinet

2. Tuner-IF Block Removal

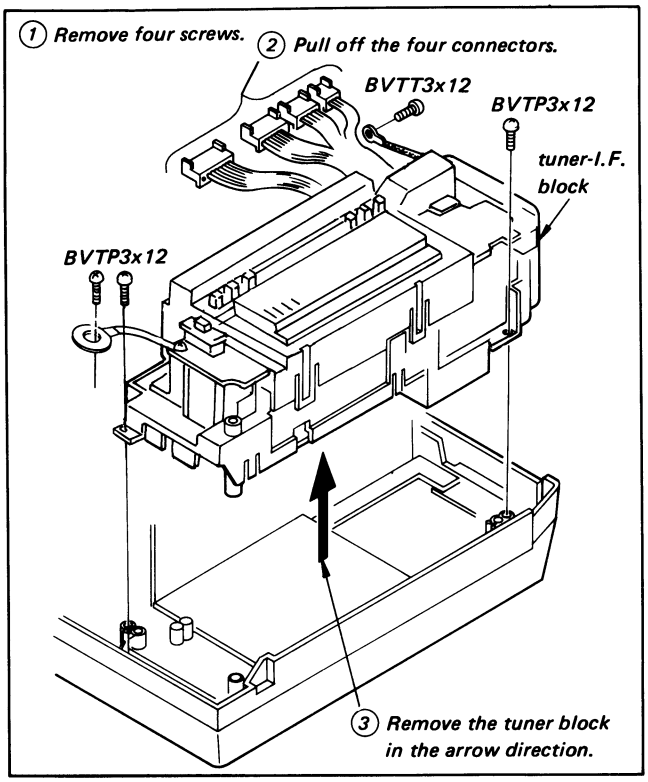


Fig. 1-2.

3. Timer Block Removal

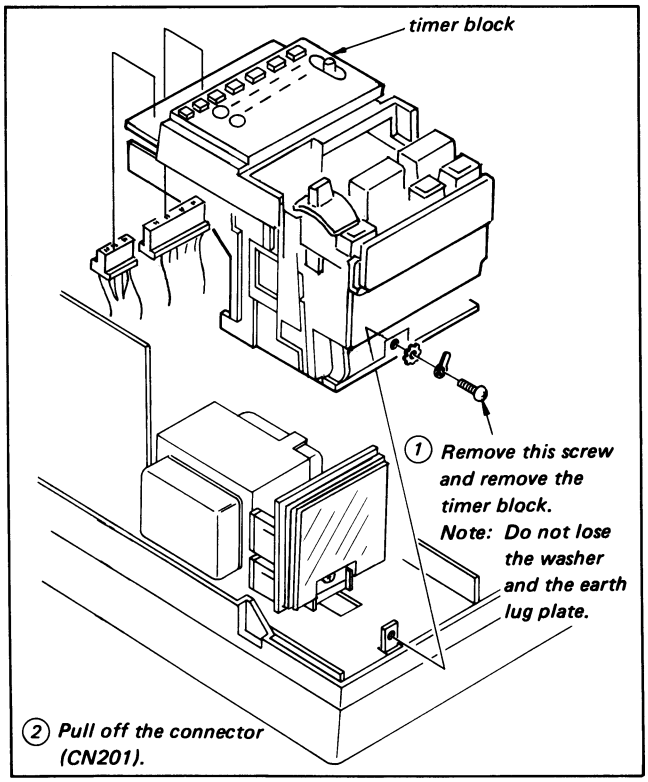

timer block
① Remove this screw and remove the timer block.
Note: Do not lose the washer and the earth lug plate.
② Pull off the connector (CN201).

Fig. 1-3.

4. YC-4 and SA-5 Board Removal

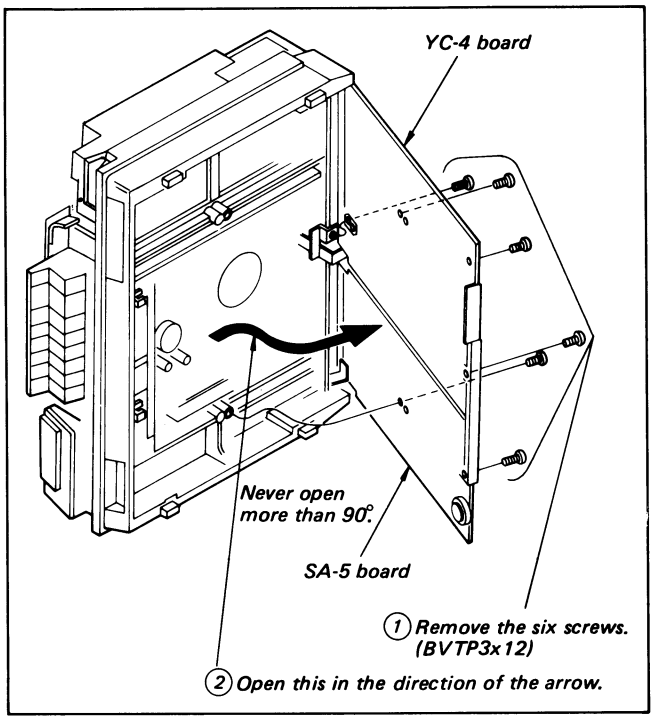


Fig. 1-4.

1-2. NOTES ON MAINTENANCE

1. Never place the machine upside down when the upper case lid has been removed from the machine, with the fan (black) attached on the drum assembly. (Since the fan projects from the chassis surface, an excessive force is applied on the drum if the machine is placed upside down, which could alter the tape movement and the tape interchangeability.)
2. Be sure to install the fan on the drum prior to the tape playback check or the electrical system alignment. If the check or the alignment is performed without the fan installed, the picture on the monitor may bend, as shown in Fig. 1-5.
3. The KR5-1S alignment tape is effective in making the tape path adjustment easy, as compared with the former alignment tapes.

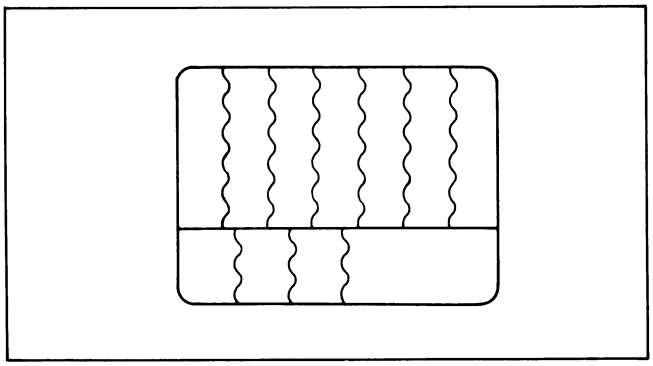


Fig. 1-5.

1-3. OPERATING RECORDER WITHOUT CASSETTE INSTALLED

1. To Set Up Threading Completion State Without Cassette and Cassette Lift Assembly.
   (This state is called "STOP mode" in this guide.)
   - Push down the cassette delection lever until the threading ring stops. (See Fig. 1-6.)

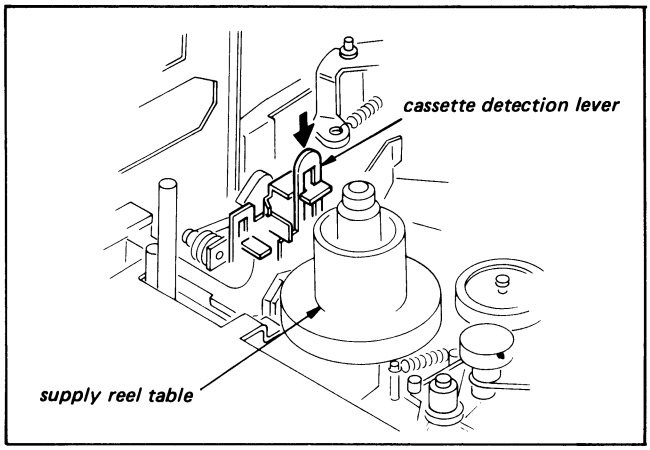


Fig. 1-6.

2. To Set Up PLAY, FAST FWD, And REWIND States Without Cassette Installed
   - Capture the cassette detection lever with an alligator clip, or an equivalent, as shown in Fig. 1-7, to place the cassette detection switch, mounted on the chassis, into the ON state. Then a desired state of operation can be set up by depressing the function button for the desired state. But note that the PLAY function button must be depressed after performing the procedures for stopping the slack sensor operation described in Section 1-4.

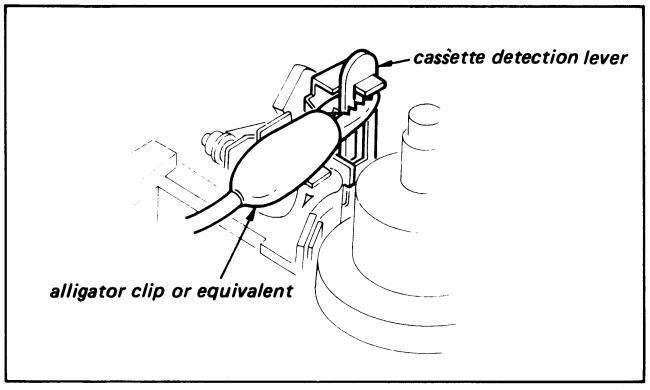


Fig. 1-7.

Note: Do not perform the cassette eject operation with the above method. The cassette eject operation without a cassette must be done by the procedure below.

3. To Set Up EJECT Mode Without a Cassette:
   - Keep pressing the EJECT button until the unthreading is completed.
4. To Set Up RECORD Mode Without a Cassette:
   - Capture the cassette detection lever with an alligator clip as shown in Fig. 1-7, manually depress the erasing protection plate as shown in Fig. 1-8, and perform the procedure in Section 1-4, "Stopping Slack Sensor Operation". Then depress the RECORD button or the AUDIO DUB button.

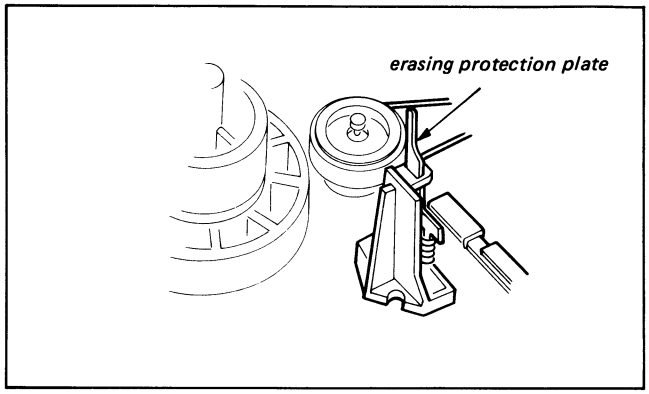


Fig. 1-8.

1-4. STOPPING SLACK SENSOR OPERATION

1. Insert a toothpick, or something like a matchstick whose point is sharpened, into the hole on the CN-4 board as shown in Fig. 1-9 to stop the movement of the slack sensor arm. A plastic pick would be preferred to the wooden one.

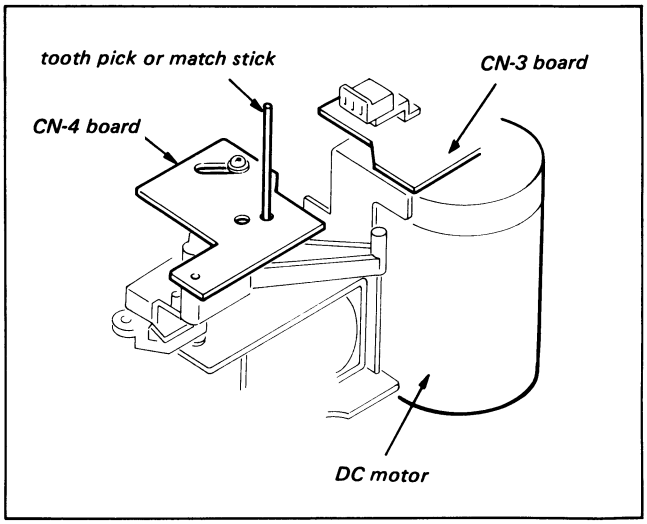
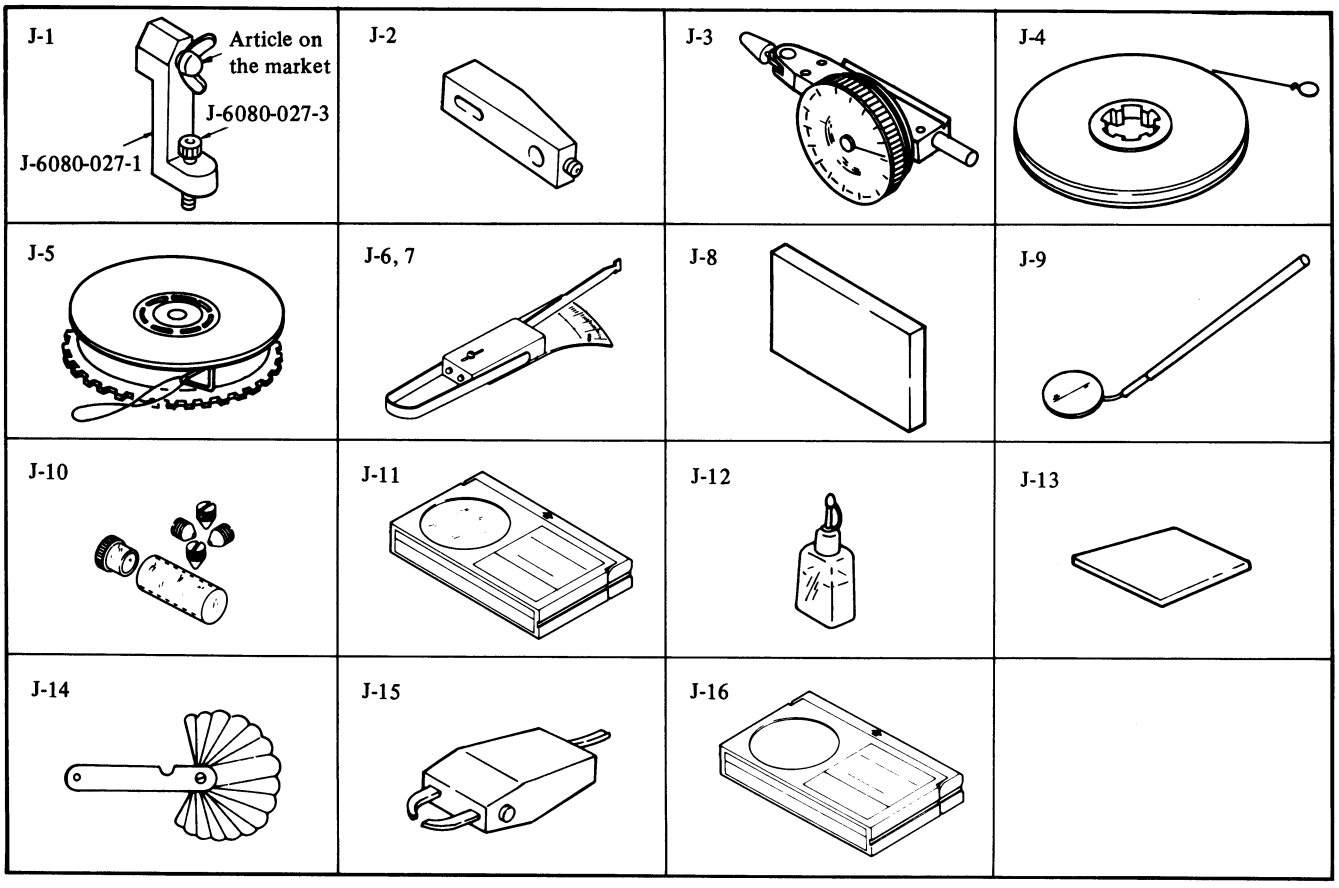


Fig. 1-9.

1-5. TOOLS AND JIGS REQUIRED

Ref. No.	Name	Code No.	Jig. No.	Use & Others
J-1	Upper Head Drum Eccentricity Alignment Jig	J-6080-027-1 J-6080-027-3	SL-0027	For adjusting video head disk eccentricity (J-2 and J-3 are component parts of the SL-0012 which has been used as a jig.)
J-2	Upper Head Drum Eccentricity Alignment Jig	J-6080-12-A	SL-0012	
J-3	Upper Head Drum Eccentricity Alignment Jig			
J-4	Reel Table Tension Gauge	J-6080-011-A	SL-0011	For various torque measurements
J-5	FWD Back Tension Measurement Jig	J-6080-002-A	SL-0002	For back tension measurement
J-6	Sector Type Gauge (for 50g.)	7-732-050-20	———	For back tension and torque measuremnts
J-7	Sector Type Gauge (for 100g.)	7-732-050-30	———	
J-8	Parallel Plate	J-608-657-0A	SL-0657	For zenith adjustment of Audio/CTL head
J-9	Inspection Mirror (Holder)	7-723-902-01	———	For tape path adjustment and tape movement adjustment and check. Place an order for holder and mirror together.
	Inspection Mirror (Mirror)	7-723-902-11	———	
J-10	Dihedral Adjustment Screws	J-6080-013-1	SL-0013	For video head dihedral adjustment
J-11	Alignment Tape (KR5-1S)	8-969-995-71	———	For overall adjustments such as tracking and picture quality
J-12	Cleaning Fluid	Y-2031-001-0	———	For various cleaning
J-13	Chamois	2-034-697-00	———	For various cleaning
J-14	Thickness Gauge	9-911-053-00	———	For various cleaning
J-15	Head Degausser	Article on the market	———	For degaussing video and audio heads (HE-2 or EH-3)
J-16	Cleaning Cassette Tape	8-888-004-00	———	For video head cleaning



SECTION 2
PERIODIC CHECK AND MAINTENANCE

- It is recommended that the following periodic check and maintenance be performed for obtaining the full function and performance of the machine and extending the lives of the machine and tape.

2-1. MAINTENANCE AFTER REPAIR

The following maintenance items must be performed after repair of the machine without regard to the operating hours of the machine.

(1) Cleaning of the video head disk assembly
- Press chamois saturated with the cleaning fluid or isopropyl alcohol lightly on the video head disk assembly and turn the fan on the drum slowly by hand for cleaning. (Never try to clean the video head disk assembly with the motor running.)
- Never move the chamois vertically against the head tips for cleaning, or the head tips will be damaged.

(2) Cleaning of the tape movement system
- Clean the surfaces which the tape contacts during its movement (the tape guides, drum assembly, capstan, and pinch roller) with chamois saturated with the cleaning fluid or isopropyl alcohol.

(3) Cleaning of the driving system
- Clean the driving elements (such as belts, idlers, and reel table surfaces) with a piece of cloth saturated with the cleaning fluid or isopropyl alcohol.

2-2. PERIODIC CHECK ITEMS

Perform the maintenance and check listed on the table below, according to user's operating hours.

○ Cleaning ◎ Lubrication ★ Replacement ☆ Confirmation

	Maintenance & Check	Replacement Part No.	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	Remarks
Tape Movement System	Cleaning of tape movement system	————	○	○	○	○	○	○	○	○	○	○	This cleaning must be done whenever a repair is made.
	Cleaning & degaussing of ACE ass'y	————	○	○	○	○	○	○	○	○	○	○	
	Cleaning, degaussing & replacement of video head disk ass'y	A-6762-031-A	○	★	○	★	○	★	○	★	○	★	The life of a head varies, depending on operational conditions and methods.
Driving System	Lubrication to thrust retainer	————	—	◎	—	◎	—	◎	—	◎	—	◎	Apply a drop of oil (such as sewing machine oil) on each of upper and lower bearings.
	Lubrication to thrust bearing (under reel table)	————	—	—	◎	—	—	◎	—	—	◎	—	Remove reel table and apply a drop of oil (such as sewing machine oil) on thrust bearing.
	Cleaning & replacement of capstan belt	3-661-708-00	○	○	★	○	○	★	○	○	★	○	•Cleaning must be done whenever repair is made.
	Cleaning & replacement of belts other than capstan belt	————	○	○	○	○	○	○	○	★	○	○	•Replacement must be done depending on operating hours on the table, or every two years.
	Replacement of FWD limiter	X-3653-310-0	—	—	★	—	—	★	—	—	★	—	
	Cleaning of iron core and opening of solenoid	————	—	—	—	○	—	—	—	○	—	—	Wipe iron core and opening of solenoids with a dry cloth.
Performance Confirmation	Abnormal sound	————	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace the section which makes abnormal sound.
	Measurement of FWD back tension	————	—	☆	—	☆	—	☆	—	☆	—	☆	Confirmation must be made according to Section 3-19. Specified value: 40 to 50g (when measured with jig tape)
	Confirmation of brake system	————	—	☆	—	☆	—	☆	—	☆	—	☆	Confirmation must be made according to Section 3-18.
	Confirmation of record & playback functions	————	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Perform the confirmation whenever repair is made.

- Belts other than capstan belt

FWD belt	:	3-653-324-00
Threading belt	:	3-659-301-00
EJECT belt	:	3-659-397-00
FF belt	:	3-659-471-00
Counter belt	:	3-661-565-00

(Note on Overhaul)

A part replacement must be done in the overhal operation, referring to the listed items. The replacement periods of the motor and the head which are not included in the chart items are as follows.

Full erase head . . . . . about 4,000 operating hours
Capstan motor . . . . . about 2,000 operating hours

2-3. OTHERS

(1) Lubricating Oil

- Be careful in applying oil to any parts. Do not permit the oil to coat any surface that is touched by the tape, heads, or drive belts.

- Be sure to use SONY oil (or equivalent) for lubrication. (Various troubles will be caused, if a different viscosity oil is used.)

  SONY Oil: Part No. 7-661-018-01
  (Mitsubishi Diamond Oil #440)

  OR THE EQUIVALENT OF SEWING MACHINE TYPE OIL

- Use the oil without dust or other foreign material for the bearing lubrication. (If an oil including dust and others is used, friction and burning of the bearing are apt to occur)

- The quantity of "a drop of oil" is about the quantity that will attach to the tip of a 2 mm diameter stick, as shown in the figure.

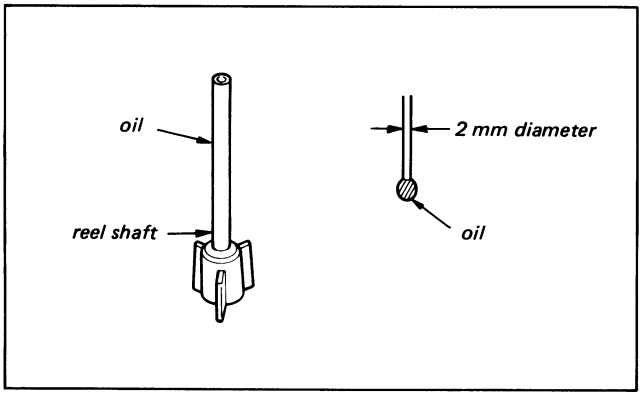


Fig. 2-1.

SECTION 3
CHECK, ADJUSTMENT, AND REPLACEMENT PROCEDURES

3-1. REPLACEMENT OF VIDEO HEAD DISK ASSEMBLY AND ECCENTRICITY ADJUSTMENT

1. Remove the video head disk assembly, following Steps (1) to (6) shown in Fig. 3-1.

Note:
- For removing fan (1), hold video head disk assembly (6) (without touching heads) and turn the fan in a counterclockwise direction.
- Never loosen the two setscrews that fasten the lower flange to the drum shaft.
- Never loosen the lower two screws of the drum support.
- Prior to installing the video head disk assembly (6), clean surfaces (A) and (B) with a piece of cloth saturated with methanol or isopropyl alcohol.

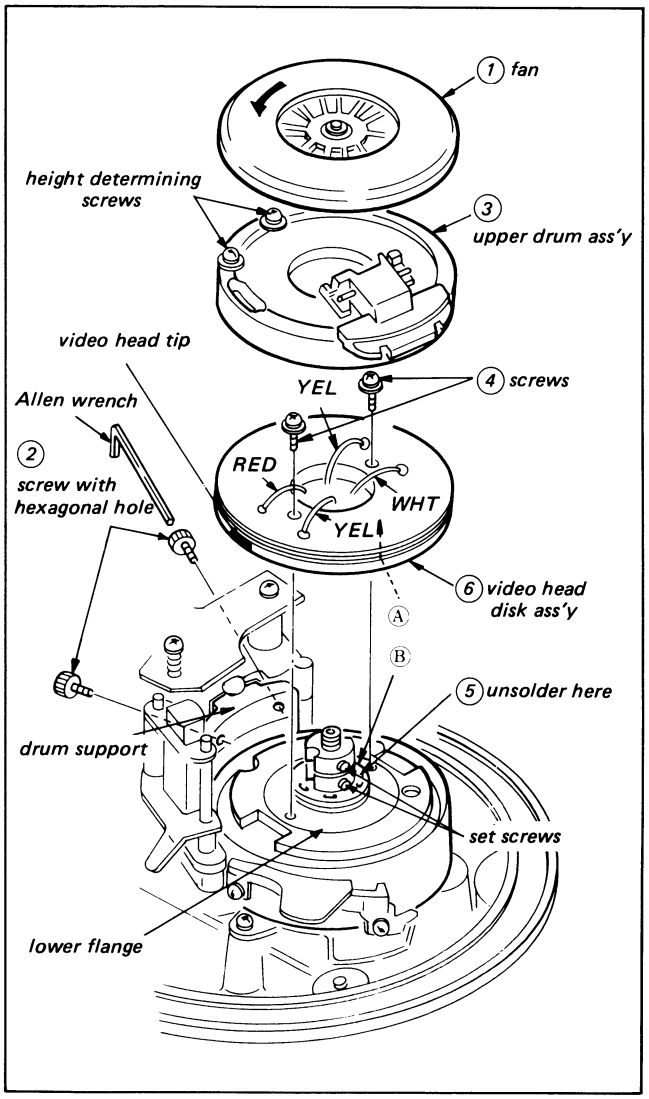


Fig. 3-1. Replacement of the video head disk assembly

2. Install the video head disk assembly tentatively (with two screws only finger-tight) and perform the eccentricity adjustment.

(i) Combine adjusting fixture parts (1), (2), and (3) as shown in Fig. 3-2. Set the combined fixture on the machine by mounting the eccentricity gauge assembly in the adjustment hole. See Fig. 3-2.

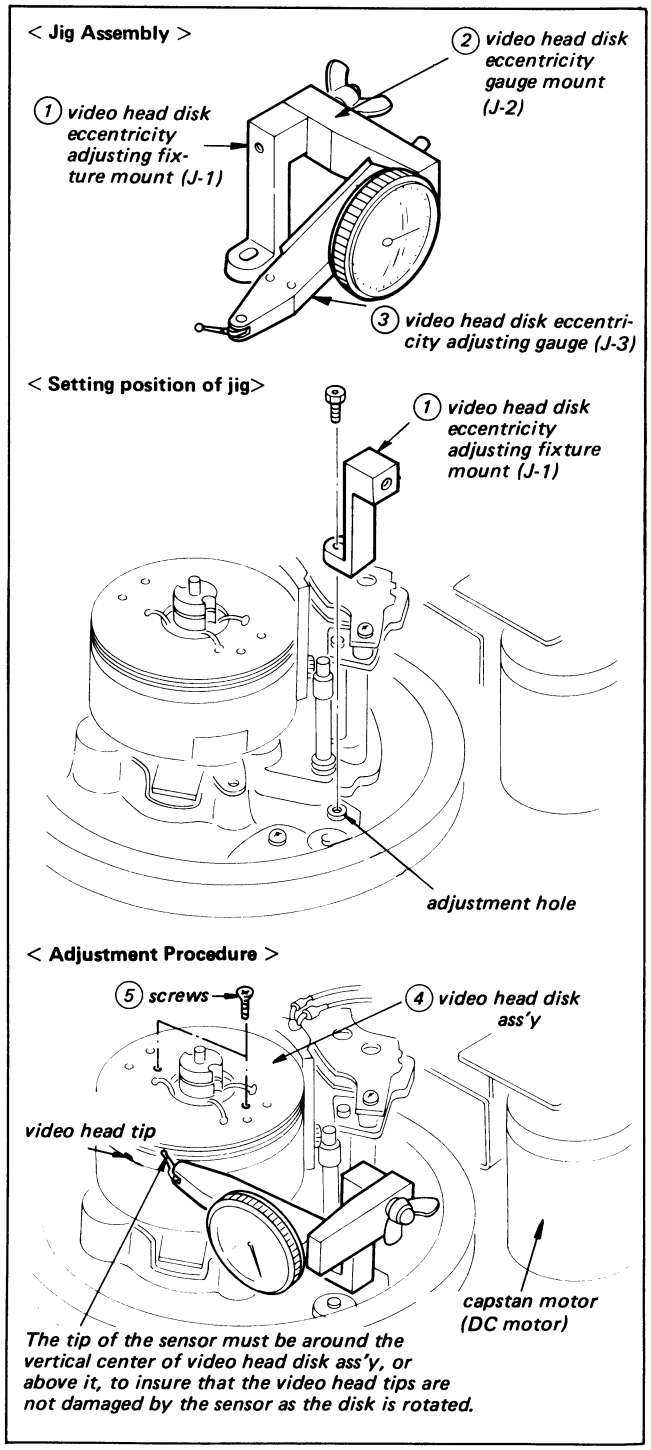


Fig. 3-2. Eccentricity adjustment of the video head disk assembly

(ii) Turn the shaft of the drum counterclockwise slowly with the fingers and adjust the video head disk position so that the variation in the reading of the drum eccentricity adjusting gauge is within 5 μm during each turn of the drum, by very gently tapping a screwdriver whose blade-tip is against the inner circumference of video head disk assembly (4).

(iii) Tighten the screws (5) that secure the video head disk assembly (4) alternately and gradually after the eccentricity adjustment is completed. (tightening torque: more than 10 kg.cm.)

(iv) After the screws are tightened, confirm again that the eccentricity deflection is within 5 μm.

(v) Solder the four leads of the head and remount the upper drum assembly while holding the upper drum height determining screws. (See Fig. 3-1.)

3. Perform the following adjustments after the replacement of the video head disk assembly.

3-20-1. Tape path adjustment
3-20-4. ACE assembly position adjustment
3-20-5. Video head dihedral adjustment
4-3-1.–2. RF switching position adjustment
4-3-3.–3. REC mode servo lock phase adjustment
4-4-1. Playback amplifier frequency characteristic adjustment
4-4.–16. Y-FM record current adjustment
4-4.–17. Chroma record current adjustment

3-2. REPLACEMENT OF DRUM ASSEMBLY

1. Stand the machine on its left side. Open the YC-4 and SA-5 boards. (Refer to Section 1-1-4.)
2. Remove FF belt (1) and drum shield (2) shown in Fig. 3-3.
3. Remove two screws (1) and connectors (2) and (3) shown in Fig. 3-4. The drum assembly can then be removed, by pulling it up.
4. Loosen the rotor assembly by inserting a long-nose pliers or a screwdriver into the two rotor holes shown in Fig. 3-5 and removing the N5φ nut and SW5φ washer. Pull off the rotor assembly.
5. Remove the screw mounting the stator assembly (shown in Fig. 3-5) and pull off the stator assembly.
6. Install the rotor assembly and the stator assembly (removed in Steps 4 and 5) onto the new drum assembly.

Note: Install the stator assembly so that the 3P connector on the stator assembly fits into the slot of the shield case assembly.

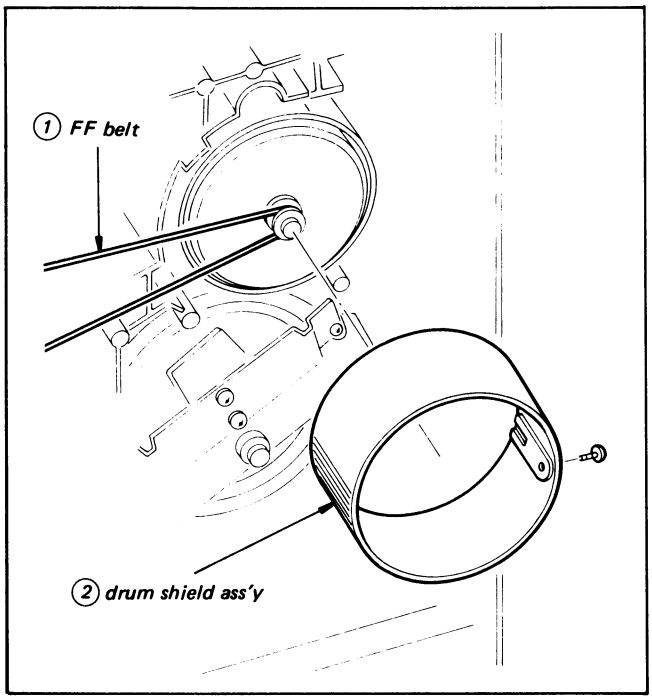


Fig. 3-3. Replacement of drum assembly (1)

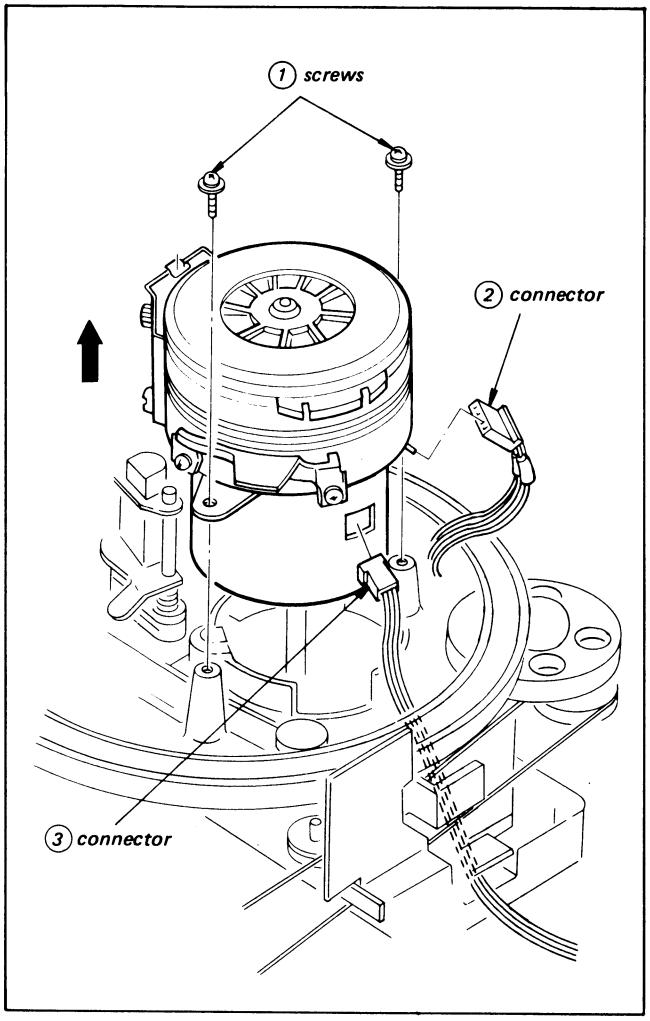


Fig. 3-4. Replacement of drum assembly (2)

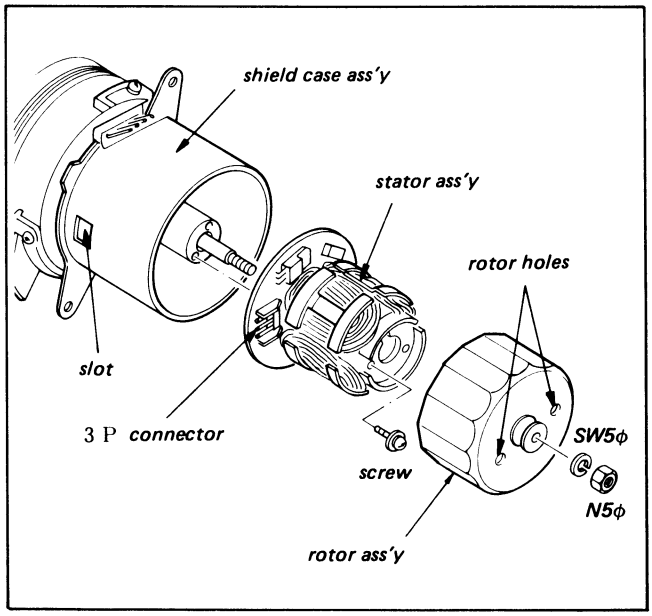


Fig. 3-5. Replacement of drum assembly (3)

7. Install two connector, the drum shield assembly, and the FF belt on the drum assembly.

Note: 1. The bottom edge of the drum shield must be flush with the bottom edge of the shield base assembly.

2. Do not tighten the drum shield set screw too much or housing will distort.

Pull the leads of connector (A) in the arrow direction and dress the leads so that the leads do not touch the EJECT belt. (See Fig. 3-6.)

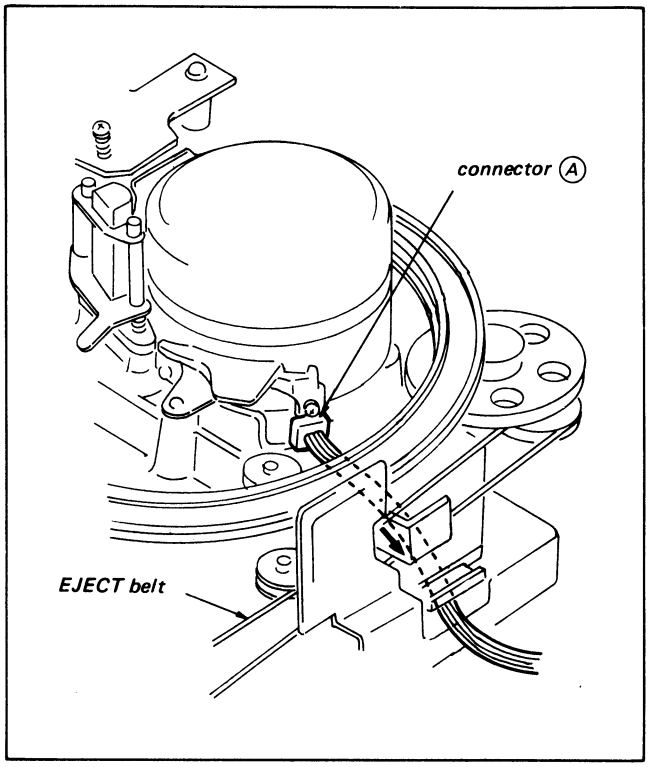


Fig. 3-6. Replacement of drum assembly (4)

8. Perform the following adjustments after the replacement.

3-20-1. Tape path adjustment
3-20-4. ACE assembly position adjustment
4-3-1. Drum servo system adjustment
4-4-1. Playback amplifier frequency characteristic adjustment
4-4.–16. Y-FM record current adjustment
4-4.–17. Chroma record current adjustment

3-3. REPLACEMENT OF CAPSTAN DC MOTOR

1. Stand the machine on its left side. Open the YC-4 and the SA-5 boards. (Refer to Section 1-1-4.)
2. Remove the DC motor from the drum base, following Steps ① to ④ shown in Fig. 3-7.
3. Take out the DC motor, following Steps ① to ③ shown in Fig. 3-8.

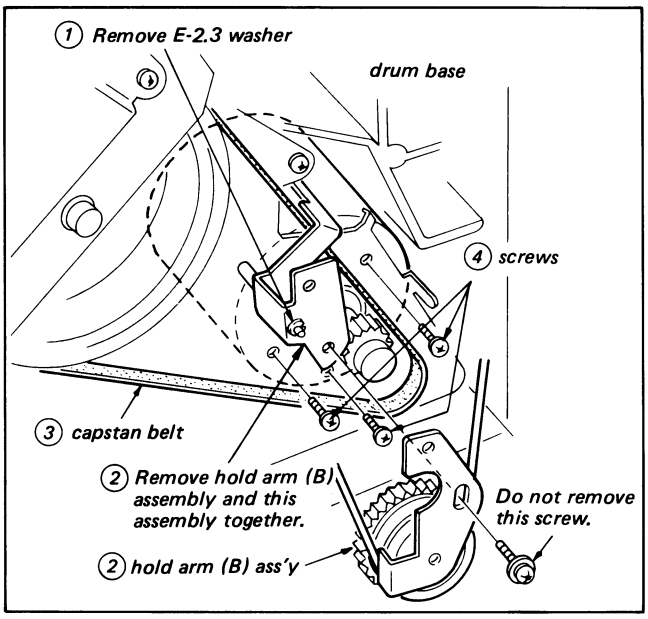

① Remove E-2.3 washer
drum base
④ screws
③ capstan belt
② Remove hold arm (B) assembly and this assembly together.
Do not remove this screw.
② hold arm (B) ass'y

Fig. 3-7. Replacement of DC motor (1)

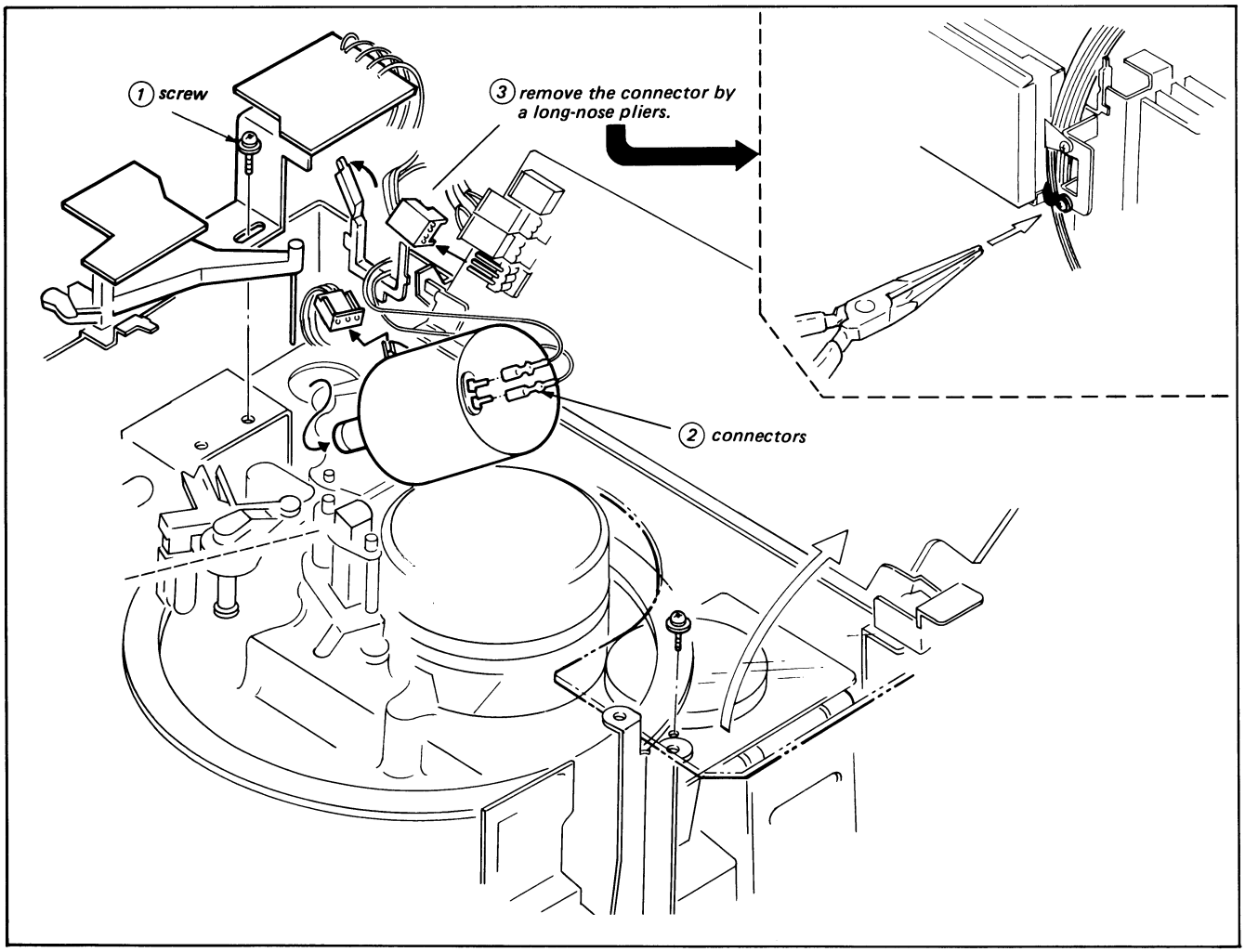


Fig. 3-8. Replacement of DC motor (2)

4. Remove capstan shield (1) and motor puller assembly (2) from the defective motor and install them on the replacement motor. (See Fig. 3-9.)

Note: Install motor pulley assembly (2) so that there is a clearance of approx. 0.5mm between the motor pulley assembly and capstan motor (3).

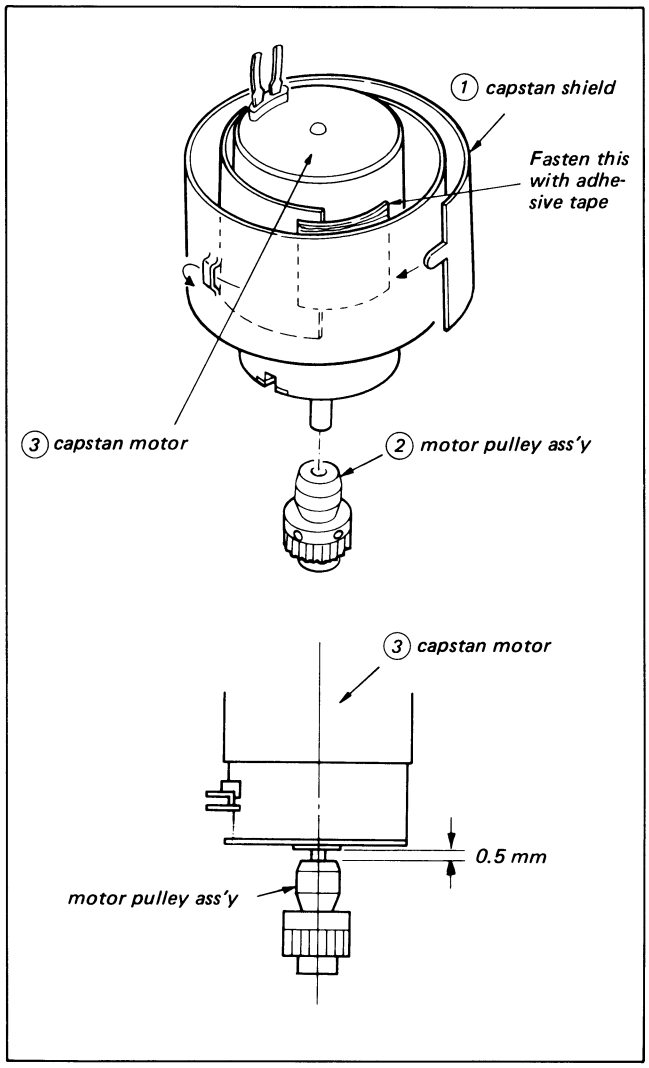


Fig. 3-9. Replacement of DC motor

5. Perform the following adjustment after the replacement.

4-3-2.(2) Capstan free speed adjustment

3-4. REPLACEMENT AND ADJUSTMENT OF TENSION REGULATOR ARM PLATE ASSEMBLY AND TENSION REGULATOR BAND ASSEMBLY

The tension regulator arm replacement must be done carefully, following the procedure below, because the tape interchangeability is much affected by the tension regulator arm operation.

3-4-1. When Tension Regulator Band Assembly is Replaced;

1. The tension regulator band assembly can be removed after removing screw (1) and hook (2) shown in Fig. 3-10.
2. Perform the tension regulator FWD position adjustment described below after the replacement.
   (i) Place the machine, without an inserted cassette, into the STOP mode. (Refer to Section 1-3.)
   (ii) Set up the PLAY mode.
   (iii) Move the tention regulator band assembly (3) in the arrow direction as shown in Fig. 3-10 so that the positional relationship of the brake band assembly is as shown (A) in Fig. 3-10. Then tighten screw (1).
   (iv) Perform the FWD back tension adjustment, Section 3-19, after the replacement.

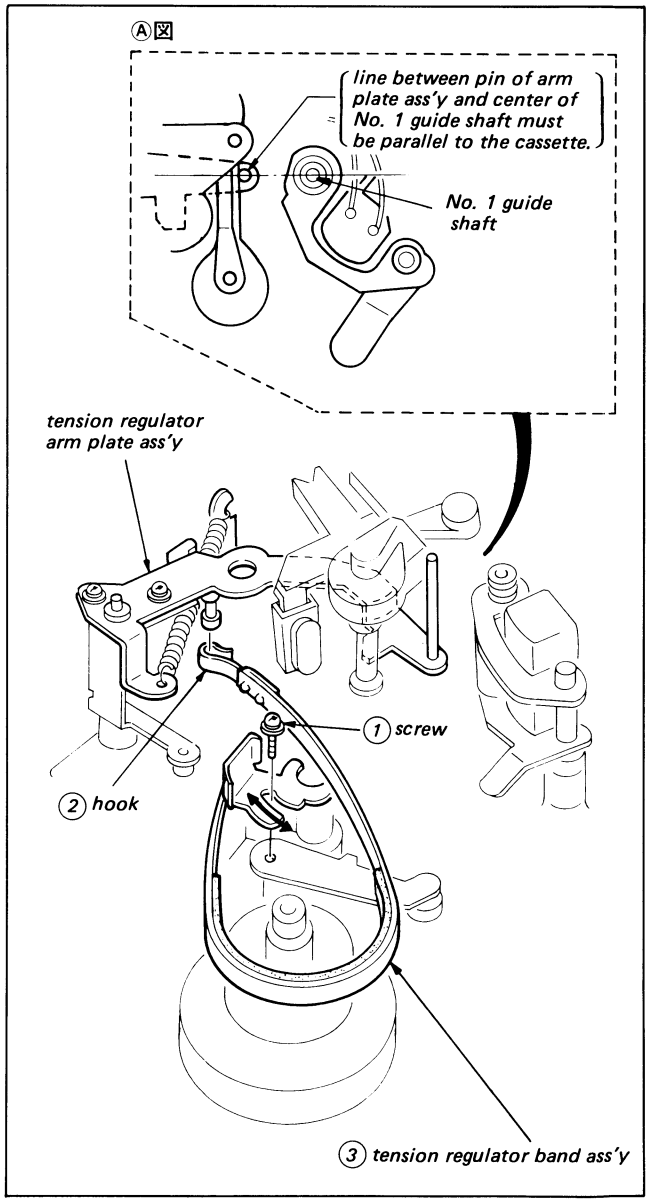

Ⓐ区
line between pin of arm plate ass'y and center of No. 1 guide shaft must be parallel to the cassette.
No. 1 guide shaft
tension regulator arm plate ass'y
(1) screw
(2) hook
(3) tension regulator band ass'y

Fig. 3-10. Replacement and adjustment of the tension regulator band assembly

3-4-2. When Tension Regulator Arm Plate is Replaced:

1. The tension regulator arm plate can be removed after removing two screws (2), spring (3), E-3 (8) and washer (9) shown in Fig. 3-11.

2. After the replacement, perform the tension regulator FWD position adjustment as follows.

   (i) Set up the STOP mode without an installed cassette. (Refer to Section 1-3.)

   (ii) Set up the PLAY mode.

   (iii) Loosen screw (5) that mounts tension regulator band assembly (4) as shown in Fig. 3-11. Move tension regulator band assembly (4) in the arrow direction, and tighten screw (5) tentatively when the condition shown in (A) is set up.

   (iv) Insert a standard blade-tip screwdriver into section (B), adjust the clearance between release link (1) assembly (6) and tension regulator arm assembly (7), shown in Fig. 3-11, to be 2 to 2.5 mm, and tighten screw (2).

   (v) Repeat Steps (iii) and (iv) again and tighten screws (2) and (5).

   (vi) After the completion of the above steps, perform the FWD back tension adjustment, Section 3-19.

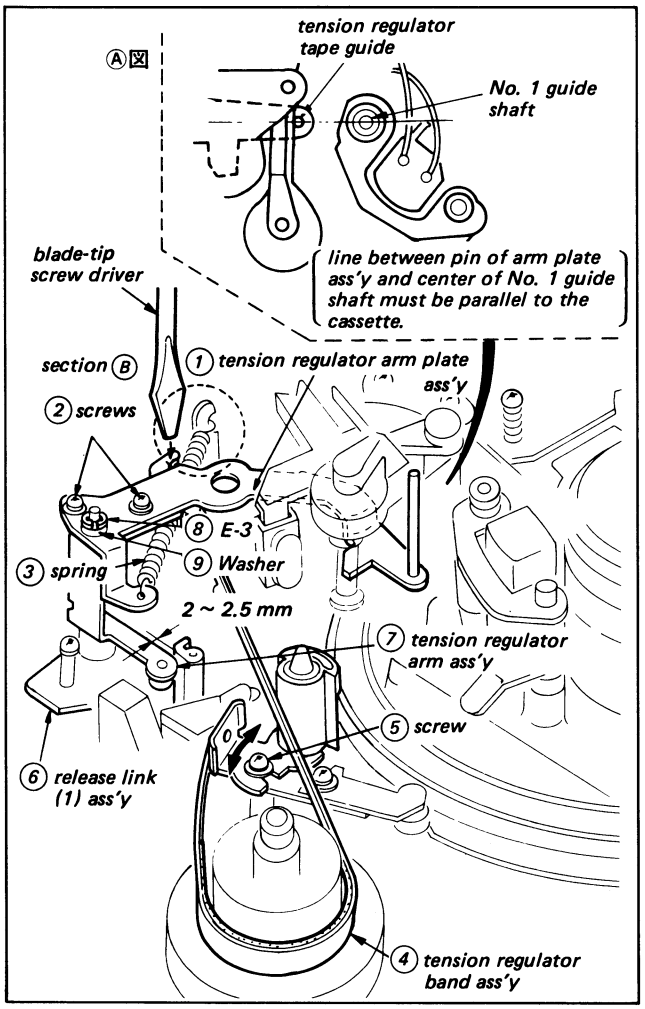

tension regulator tape guide
No. 1 guide shaft
blade-tip screw driver
line between pin of arm plate ass'y and center of No. 1 guide shaft must be parallel to the cassette.
section (B)
(1) tension regulator arm plate ass'y
(2) screws
(8) E-3
(9) Washer
(3) spring
2 ~ 2.5 mm
(7) tension regulator arm ass'y
(5) screw
(6) release link (1) ass'y
(4) tension regulator band ass'y

Fig. 3-11. Replacement and adjustment (1) of tension regulator arm plate assembly

3. Play back the 1 MHz segment of the alignment tape (KR5-1S). Loosen the lock screw and adjust screw "A" in Fig. 3-12 so that the RF waveform becomes that (see the waveform in the tape path adjustment, Section 3-20-1.) when the TRACKING knob is turned to the right and left from its center detent position and so that the tape is not apart from the flanges of guides (1), (2) and (3) shown in Fig. 3-12 and there is not a large tape curl at the guides.

   Note: Do not turn screw "A" to the right and left more than 90 degrees from its initial position.

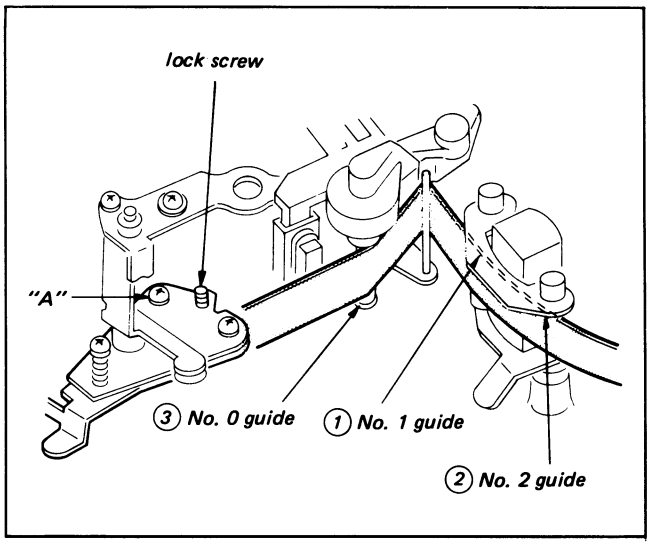


Fig. 3-12. Replacement and adjustment (2) of tension regulator arm plate assembly

4. Confirm that there is not a large bending of the tape at each of the tension regulator guide pin section and the No. 0 guide section shown in Fig. 3-13 after the completion of the adjustment. If the bending is found, repeat Step 3.

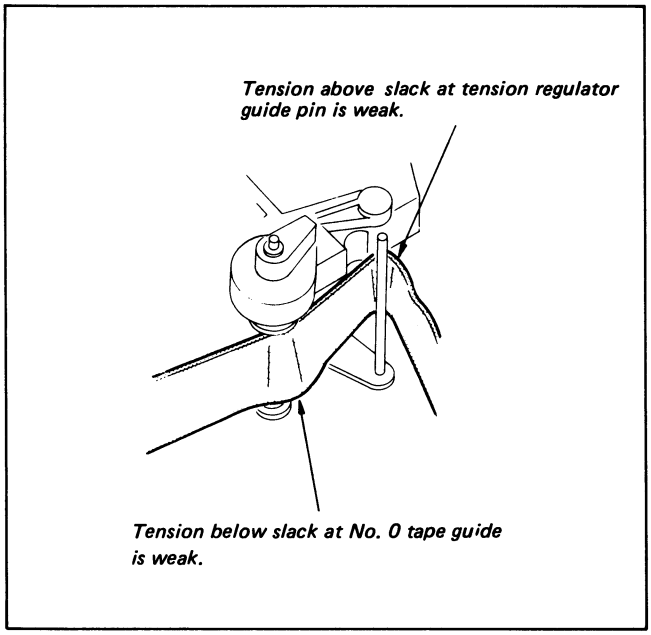


Fig. 3-13. Replacement and adjustment (3) of tension regulator arm plate assembly

3-5. REPLACEMENT OF CASSETTE-LIFT ASSEMBLY

1. Set up the unthreading state and remove the cassette-lift assembly by loosening four screws.
2. Install the cassette-lift assembly so that the reel tables and the reel holes on the cassette holder from concentric circles. (See Fig. 3-14.)
3. Insert the cassette into the cassette-lift compartment after the installation, set up the EJECT mode to perform unthreading after setting up the STOP mode, and confirm that the cassette-lift compartment assembly lifts. Make the confirmation after performing the lid opener position adjustment in Section 3-9.

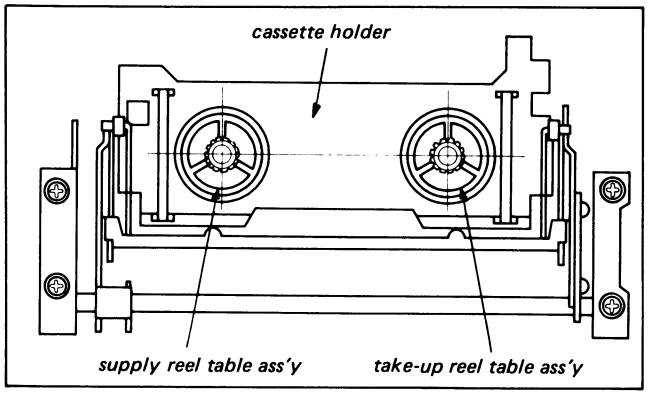


Fig. 3-14. Replacement of cassette-lift assembly

3-6. ADJUSTMENT OF REEL TABLE HEIGHT

- Since the reel table height serves as the reference of the tape movement system, the height must be adjusted caerfully after the reel table replacement.

1. Measure the height of the reel table with a slide caliper prior to the removal of the old reel table. (See Fig. 3-15.)
2. Place a new reel table, measure its height, and adjust height by adding or removing the adjusting spacer so that the difference in the heights of the former and new reel tables is within 0.1mm. (See Fig. 3-15.)

3-7. POSITION ADJUSTMENT, PAUSE SOLENOID

1. Set up the STOP mode without the cassette installed. (Refer to Section 1-3.)
2. Set up the REC PAUSE state so as to place the solenoid into the energized state.
3. Loosen the screws (1) that mount the solenoid and move the solenoid in the direction indicated by screw (A) as shown in Fig. 3-16 so that a clearance is made between the brake rubber and the take-up reel table.
4. Then move the solenoid in the direction shown by arrow (B) and tighten screws (1) after the solenoid is moved further 0.8 mm in the (B) arrow direction from the point where the brake rubber begins to touch the take-up reel table assembly.

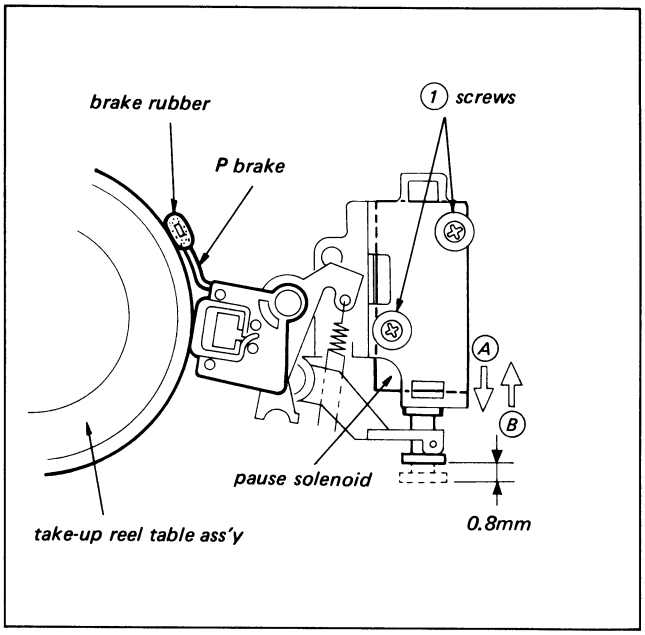


Fig. 3-16. Position adjustment of pause solenoid (Stroke adjustment)

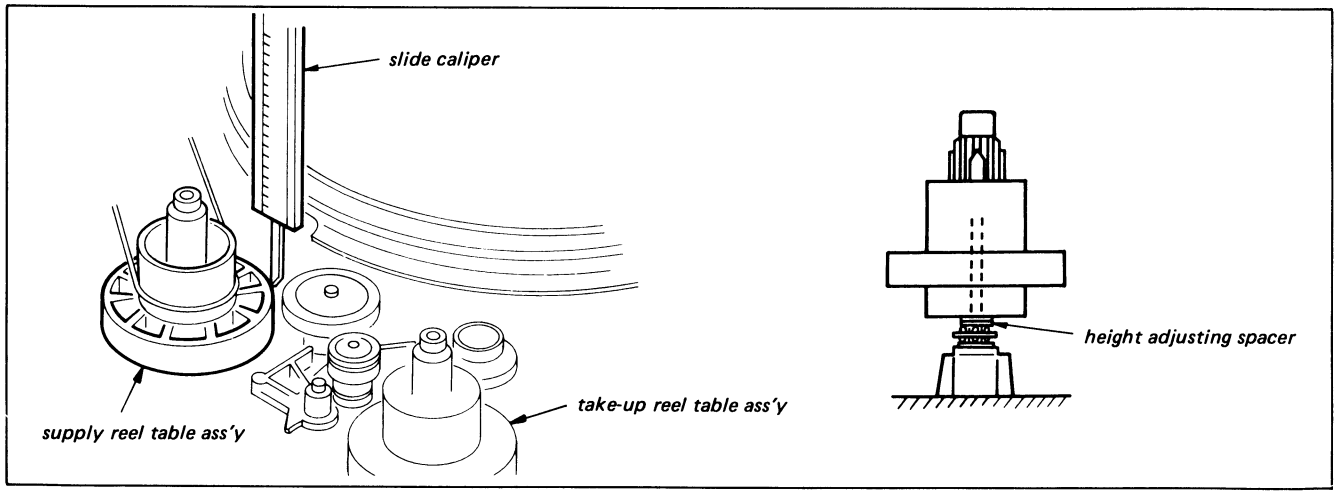


Fig. 3-15. Adjustment of reel table height

3-8. ADJUSTMENT OF THREADING AND UNTHREADING

3-8-1. Operation Check of Cassette-in Switch

1. Set up the unthreading completion state without an inserted cassette and turn off the power.
2. Set section (A) as shown in Fig. 3-17.
3. Confirm that the microswitch mounted on the underside of the machine does not turn on when the cassette detection lever (1) is pushed in the arrow direction.
4. Set section (A) as shown in Fig. 3-18.
5. Confirm with a click that the microswitch mounted on the underside of the machine turns on when the cassette detection lever (1) is pushed in the arrow direction.
6. Adjust the mounting position of cassette detection (1) so that it moves more than 1.5mm further from the point where the clock is heard.

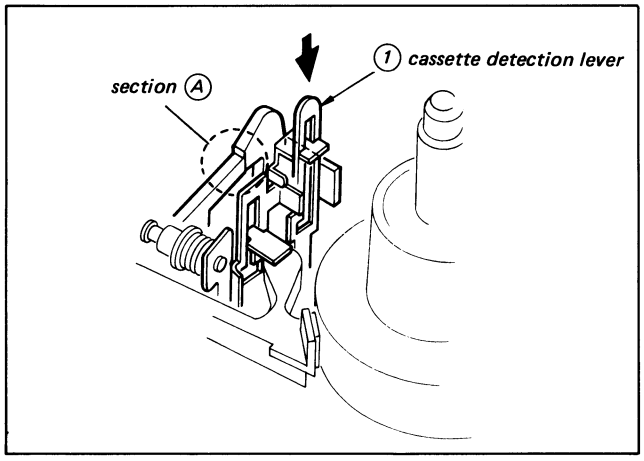


Fig. 3-17. Operation check of cassette-in switch

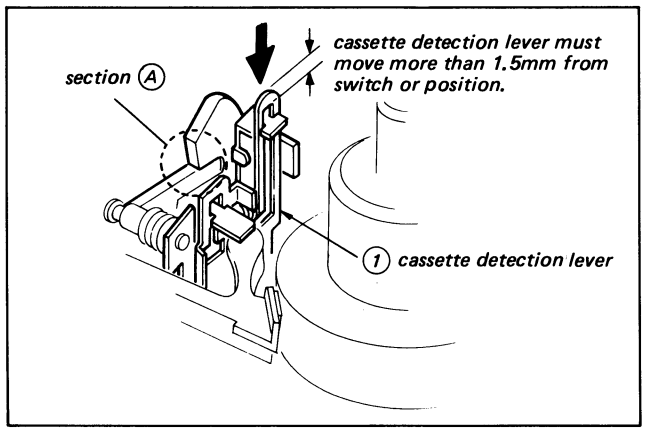


Fig. 3-18. Operation check of cassette-in switch

Note:
- The problem where the cassette-lift assembly does not lock occurs if the microswitch turns on in the condition shown in Fig. 3-17.
- The problem where the modes other than the EJECT mode cannot be set up occurs if the microswitch does not turn on in the state shown in Fig. 3-18.

3-8-2. Position Adjustment of Threading Unit B Assembly and Control Plate

1. Push down the cassette detection lever with fingers to perform the threading operation and release the lever when the threading ring assembly (5) shown in Fig. 3-19 has turned 90 degrees.
2. Loosen screws (1) shown in Fig. 3-19. Make the clearance (0.2mm) between midway gear (B) (4) and threading ring assembly (5) and tighten screws (1).
3. Make a clearance of 0.5mm between control plate (3) and threading ring assembly (5) and tighten screw (6).

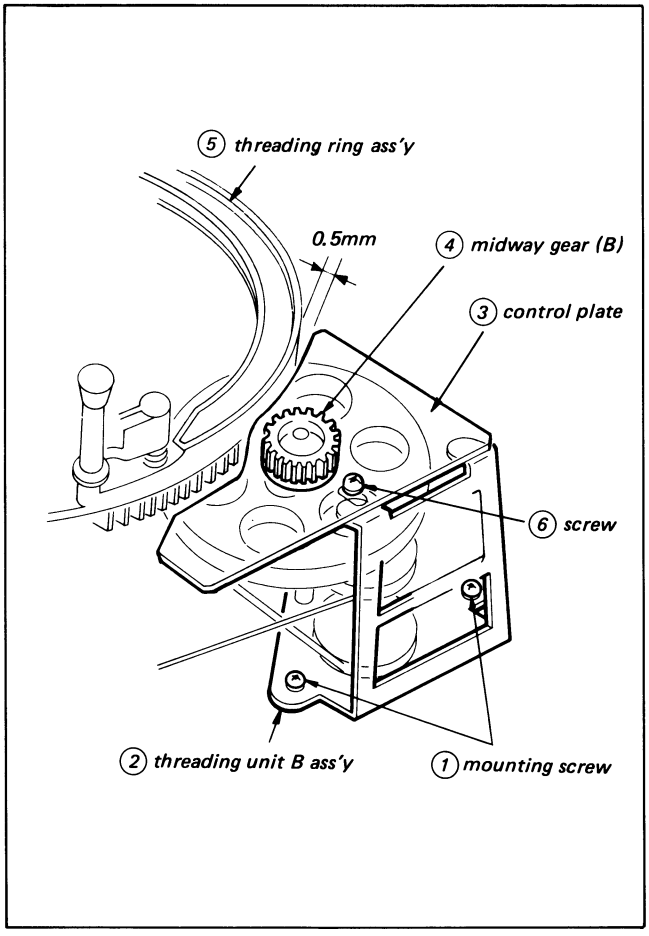


Fig. 3-19. Position adjustment of threading unit B assembly and control plate

3-8-3. Position Adjustment of Gear Pulley Hold Arm Assembly

1. Loosen screw (1) shown in Fig. 3-20, adjust the position of the gear pulley hold arm assembly so that the clearance between the motor pulley assembly (2) and the gear pulley 3 is 0.3 mm, and tighten screw (1).

3-8-4. Adhesion of Brake Shoe

1. Glue the barke shoe to the groove on the brake arm as shown in Fig. 3-20.

Note: If the brake shoe is not glued in the right position, it is possible for the brake shoe to touch the capstan belt. If the shoe is removed, there is a possibility of the occurrence of an abnormal sound at the initial stage of the unthreading.

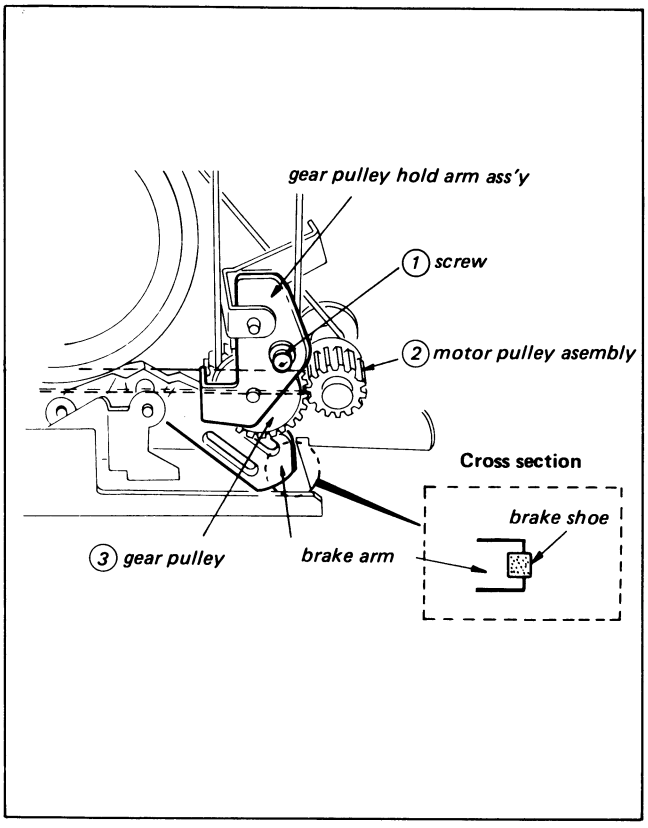


Fig. 3-20. Position adjustment of gear pulley hold arm assembly

3-8-5. Clearance Adjustment of Cassette Lift Assembly Arm

- Since a poor adjustment of the clearance causes the condition that the cassette lift assembly arm (2) is in strong contact with the threading ring assembly (3), the threading and unthreading cannot always be performed smoothly. When the clearance is larger than the specified value, the lock of the cassette lift assembly comes loose and the cassette lift assembly lifts during the unthreading, damaging the tape.

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Loosen screw (1) and adjust the position of the cassette lift assembly arm (2) with the thickness gauge so that the clearance between the cassette lift assembly arm (2) and the threading ring (3) satisfies the specification (0.2 mm to 0.5 mm). (See Fig. 3-21.)
3. Check the value again after the screw is tightened.

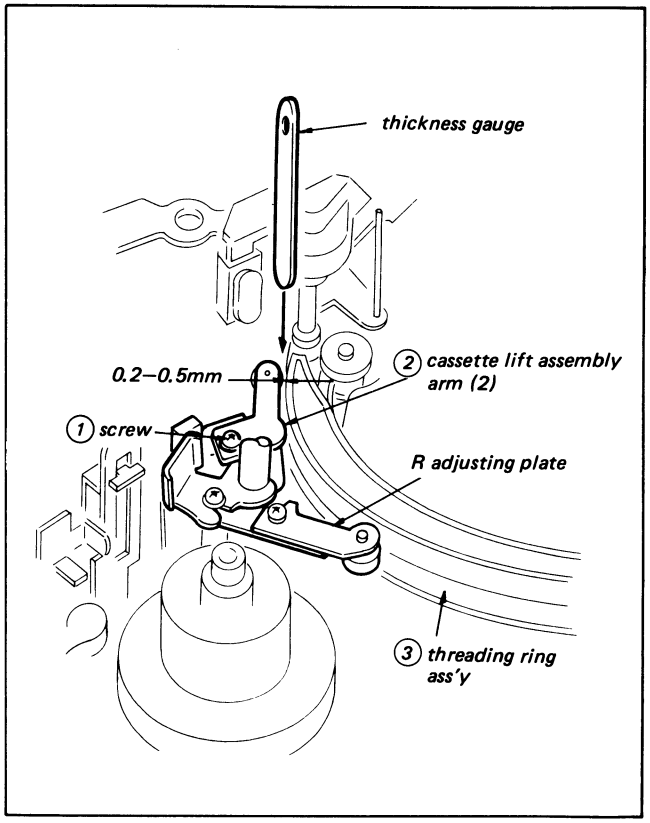


Fig. 3-21. Clearance adjustment of cassette lift assembly arm

3-8-6. Clearance Adjustment of Ring Arm

- The ring arm serves to stabilize the position of the threading ring at the completion of threading. If this adjustment is wrong, there is a possibility that the threading ring may move, from the position reached at the threading completion point, during the PLAY, FAST FWD and RECORD modes.

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Set up the PLAY mode.
3. Loosen screw (1) shown in Fig. 3-22 and adjust R adjusting plate assembly (2) so that the clearance between the roller of R adjusting plate assembly (2) and threading ring assembly (3) satisfies the specification (0 to 0.2 mm). Repeat the threading and unthreading operations several times, confirm that the roller of R adjusting plate assembly (2) drops into the bottom of the cam of the threading ring, and tighten screw (1) after the confirmation.

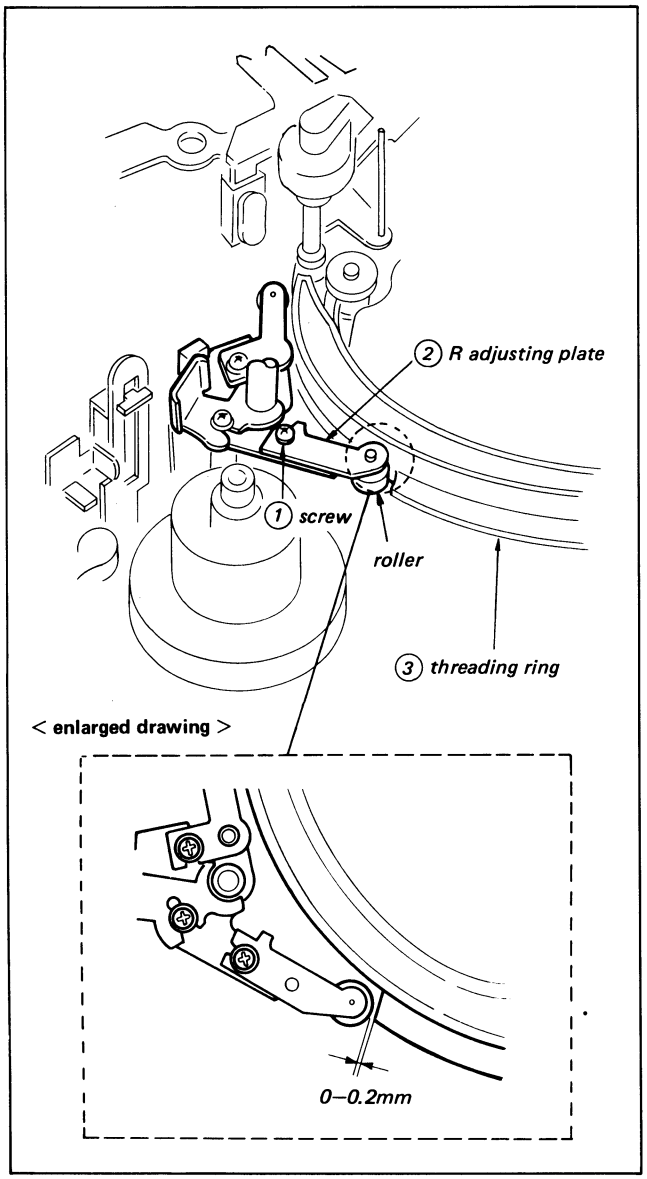


Fig. 3-22. Clearance adjustment of ring arm

3-8-7. Check of Unthreading Completion

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Set up the EJECT mode to complete the unthreading.
3. Confirm that the roller of cassette lift assembly arm (2) shown in Fig. 3-23 moves in the arrow direction when the cassette lift assembly arm (2) is pushed in the arrow direction.
4. Confirm that the tension regulator arm assembly is in contact with the boss of the cassette position-determining post. (See Fig. 3-23.)

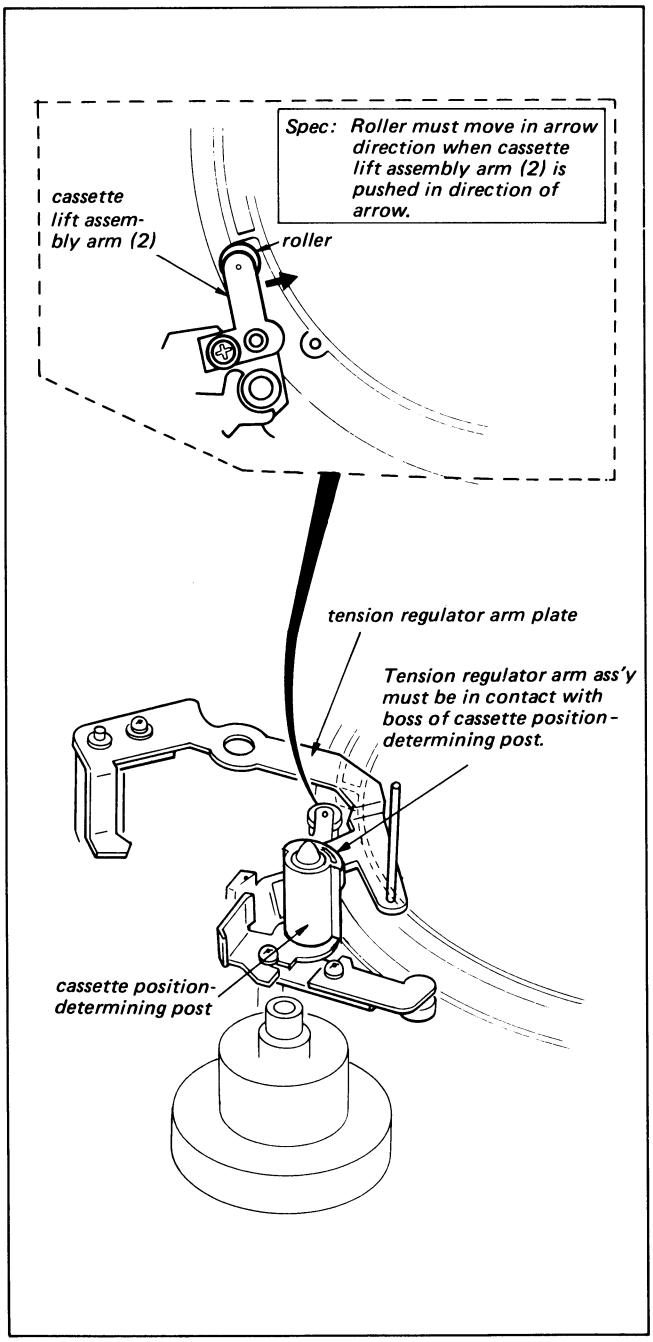

Spec: Roller must move in arrow direction when cassette lift assembly arm (2) is pushed in direction of arrow.
cassette lift assembly arm (2)
roller
tension regulator arm plate
Tension regulator arm ass'y must be in contact with boss of cassette position-determining post.
cassette position-determining post

Fig. 3-23. Check of unthreading completion

3-9. POSITION ADJUSTMENT OF LID OPENER

- The mounting position of the cassette lid opener bracket is different when the cassette lift assembly is attached and is not attached to the SL-5600.

1. When the cassette lift assembly is attached;

   (i) The plate of the cassette lid opener bracket must be near the center of the slot in the white plastic holder guide when the cassette lift assembly is lowered. If it is not in this position, bend the lower section of the cassette lid opener bracket, as shown in Fig. 3-24. for adjustment.

   (ii) Confirm that section Ⓐ in Fig. 3-24 satisfies the specification (0.5mm to 3mm) when the cassette is inserted and the PLAY mode is set up. This is the spacing between the tape and the take-up sensor.

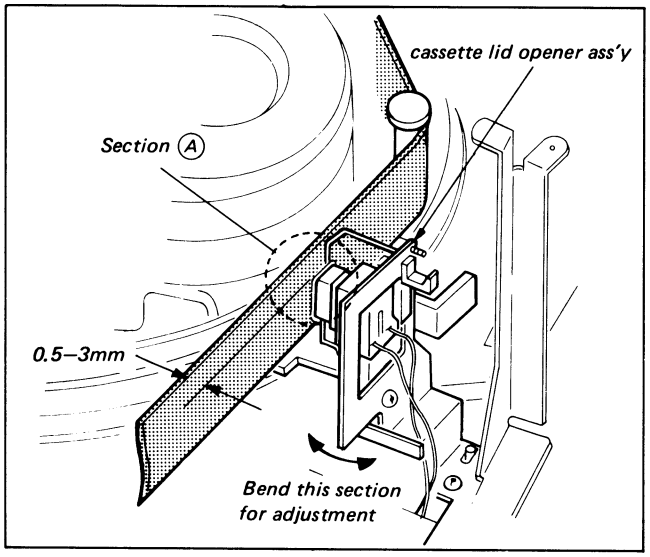


Fig. 3-24. Position adjustment of cassette lid opener metal (1)

2. When the cassette lift assembly is not attached;

   (i) Bend the lower section of the cassette lid opener bracket so that the cassette lid opener bracket positions itself almost at the center of the space marked by asterisk(*) shown in Fig. 3-25, when the cassette is placed on the four position determining posts.

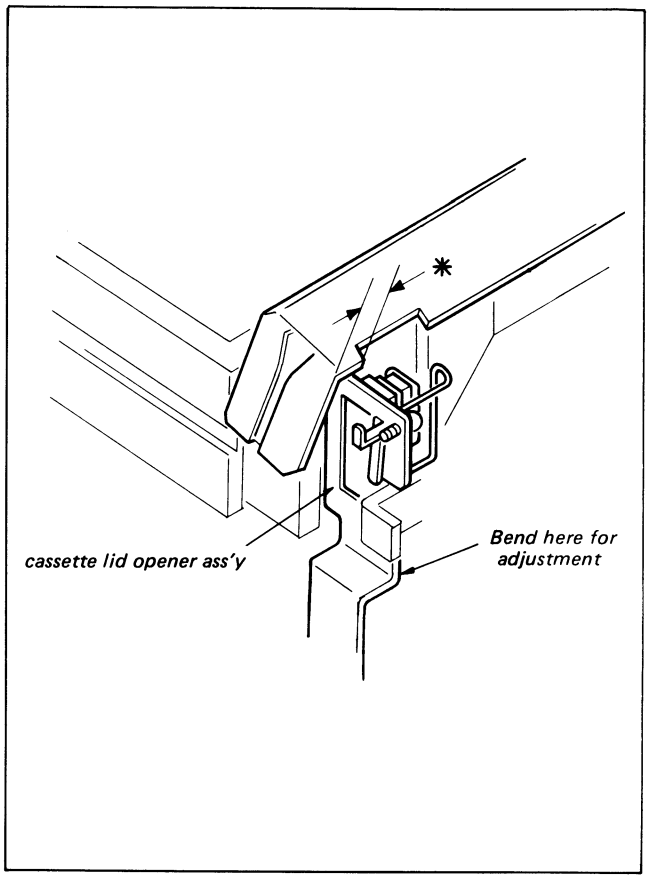


Fig. 3-25. Position adjustment of cassette lid opener metal (2)

3-10. REPLACEMENT AND ADJUSTMENT OF THREADING RING ASSEMBLY

1. Turn the threading ring to a point immediately before the threading completion position and stop it at the point where it does not touch the lock hold arm. (See Fig. 3-26.)
2. Perform procedures (1) to (5) shown in Fig. 3-26.
3. Remove the threading ring while moving the tension regulator arm assembly in the arrow direction by holding its lower section.

   Note: Do not hold the upper section of the tension regulator arm while moving the assembly.

4. Perform the adjustment of control plate (1), R adjusting plate (3), No. 0 guide section assembly (4), and ring roller unit assembly (5) after the replacement.
   (i) As to the adjustment of control plate (1), refer to "Position Adjustment of Threading Unit B assembly and Control Plate", Section 3-8-2.
   (ii) As to the adjustment of R adjusting plate (3), refer to "Clearance Adjustment of Ring Arm", Section 3-8-6.
   (iii) As to the adjustment of No. 0 guide section assembly (4), perform procedure 6 of this section.
   (iv) As to the adjustment of ring roller unit assembly (5), perform the adjustment, referring to detail drawing A in Fig. 3-26.
5. Perform the threading and unthreading several times and confirm the smooth movement of the threading ring.

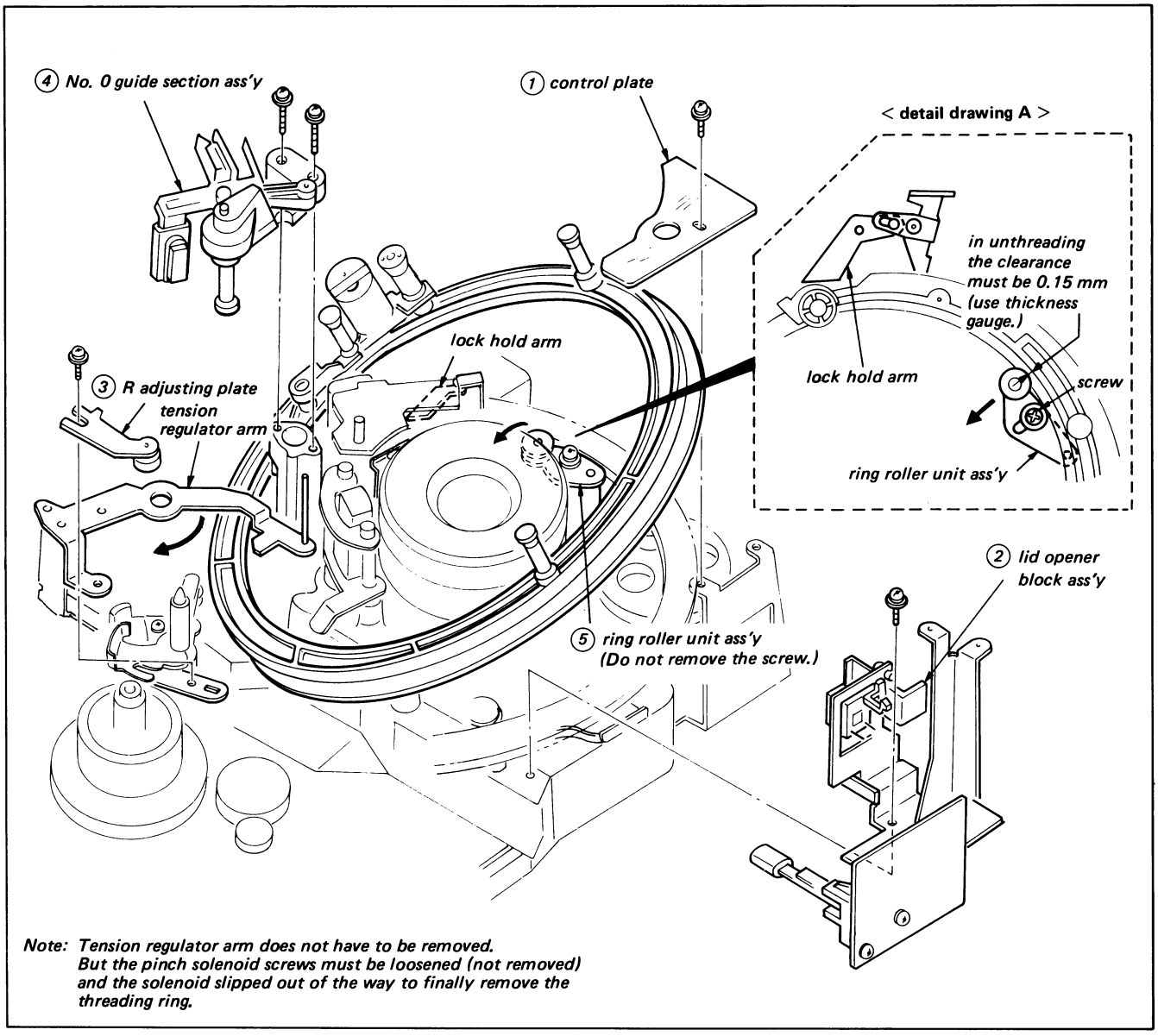

(4) No. 0 guide section ass'y
(1) control plate
< detail drawing A >
in unthreading the clearance must be 0.15 mm (use thickness gauge.)
lock hold arm
screw
ring roller unit ass'y
lock hold arm
(3) R adjusting plate tension regulator arm
(2) lid opener block ass'y
(5) ring roller unit ass'y (Do not remove the screw.)
Note: Tension regulator arm does not have to be removed. But the pinch solenoid screws must be loosened (not removed) and the solenoid slipped out of the way to finally remove the threading ring.

Fig. 3-26. Replacement of threading ring block assembly

6. Adjustment after the mounting of No.0 guide section assembly

   (i) Playback the 1MHz segment of the alignment tape (KR5-1S).

   (ii) Turn the TRACKING control knob so that the RF waveform at TP5004 on RP-1 board is 2/3 of its maximum level. (See Fig. 3-27.)

   (iii) Turn the No.0 guide shown in Fig. 3-27 fully counterclockwise (↶), then clockwise until the point where the RF waveform at the exit section becomes flat with small fluctuation, and tighten the mounting screws.

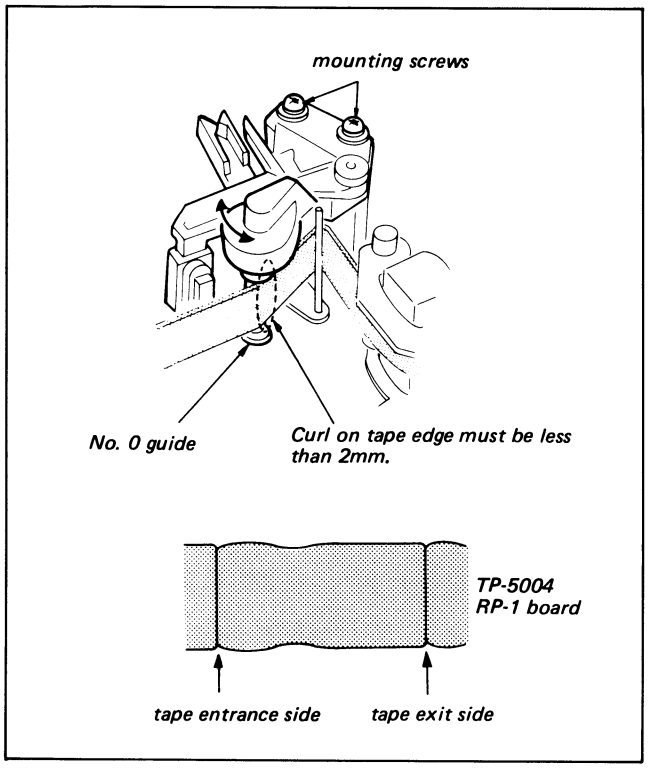


Fig. 3-27. Position adjustment of No.0 guide section assembly mounting

3-11. POSITION ADJUSTMENT OF PINCH ROLLER SOLENOID

3-11-1. Parallelism Adjustment of Pinch Press Lever

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Perform Steps ① to ③ shown in Fig. 3-28 so as to set up the state in which the screw of pinch press lever shaft adjusting plate ④ can be loosened.
3. Loosen the two screws ① fastening the pinch solenoid base ③ shown in Fig. 3-29 and tighten screws ① when the pinch solenoid base ③ becomes parallel to the drum base.
4. Loosen two screws ② shown in Fig. 3-29 by 1/3 to 1/2 turn and move pinch press lever shaft adjusting plate ④ in the direction shown by arrow B.
5. Insert a standard blade-tip screwdriver into hole F when the iron core is pulled slightly and pinch roller arm assembly ⑤ touches capstan shaft ⑥ equally along the complete length of the pinch roller. The pinch roller and the capstan should be parallel. Move the pinch press lever shaft adjusting plate ④ in the direction shown by arrow C and tighten the two screws ② when clearance A becomes 0.

   Note: If the pinch roller arm assembly ⑤ does not touch the capstan with parallel and equally force when the iron core is pulled slightly, move pinch solenoid base ③ with a standard blade-tip screwdriver in the direction shown by arrow D.

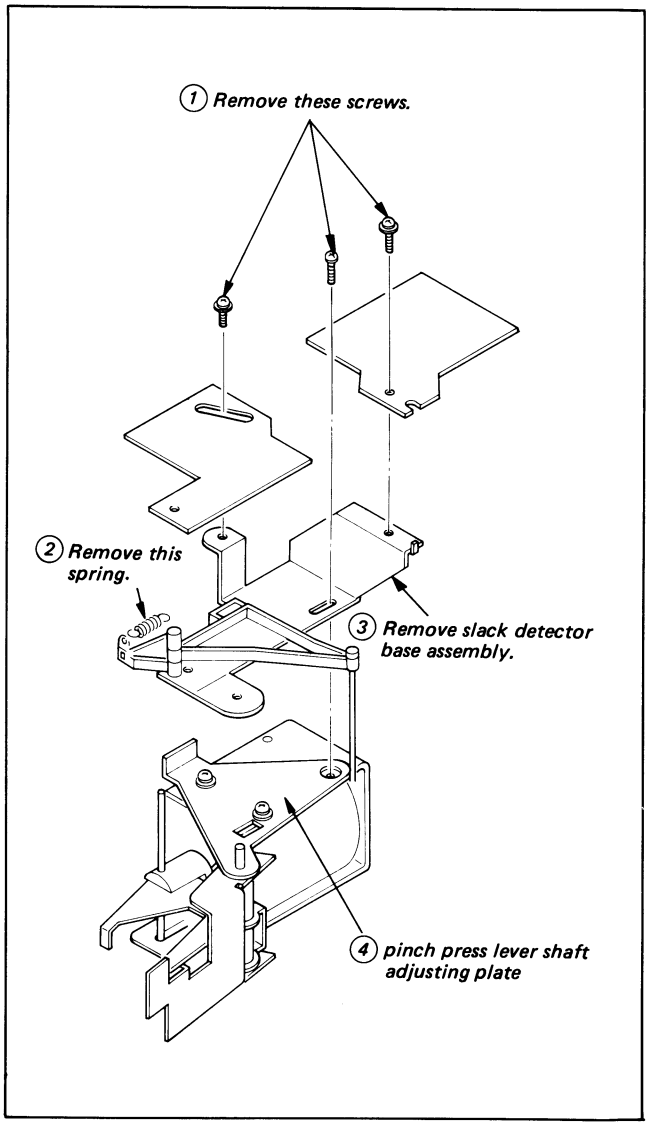

① Remove these screws.
② Remove this spring.
③ Remove slack detector base assembly.
④ pinch press lever shaft adjusting plate

Fig. 3-28. Disassembly

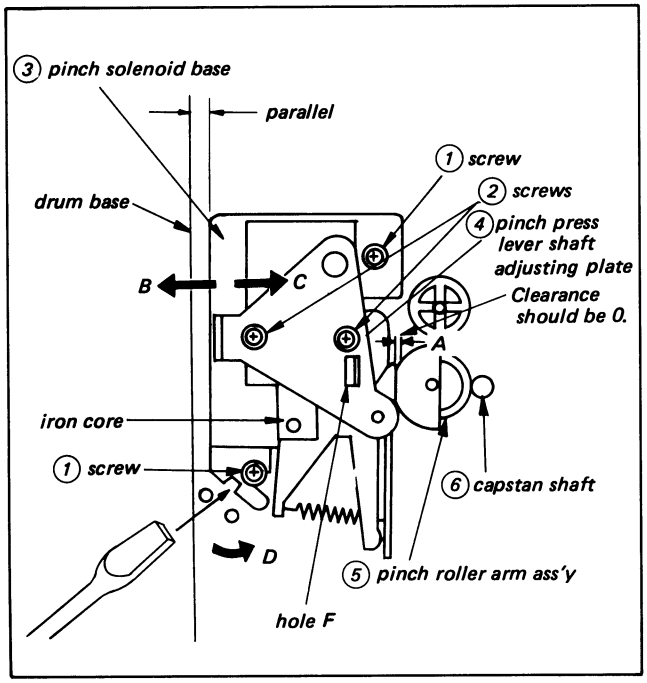


Fig. 3-29. Position adjustment of pinch roller solenoid

3-11-2. Position Adjustment of Pinch Solenoid

1. Check that "Parallelism Adjustment of Pinch Press Lever", Section 3-11-1, has been completed.
2. Loosen the two screws ① shown in Fig. 3-30 by 1/3 to 1/2 turns.
3. Insert the cassette (L-500) and set up the PLAY mode.
4. Insert the standard blade-tip screwdriver as shown in Fig. 3-30. Move pinch solenoid base ② in the arrow direction so that the specification at section B is satisfied, and tighten the two screws ①.
5. Tap the top and bottom of the tape around the capstan entrance and confirm that the specification shown in Fig. 3-31 is satisfied. If not, repeat Step 5 of Section 3-11-1, "Parallelism Adjustment of Pinch Press Lever".
6. Reverse Steps ① to ③ shown in Fig. 3-28.

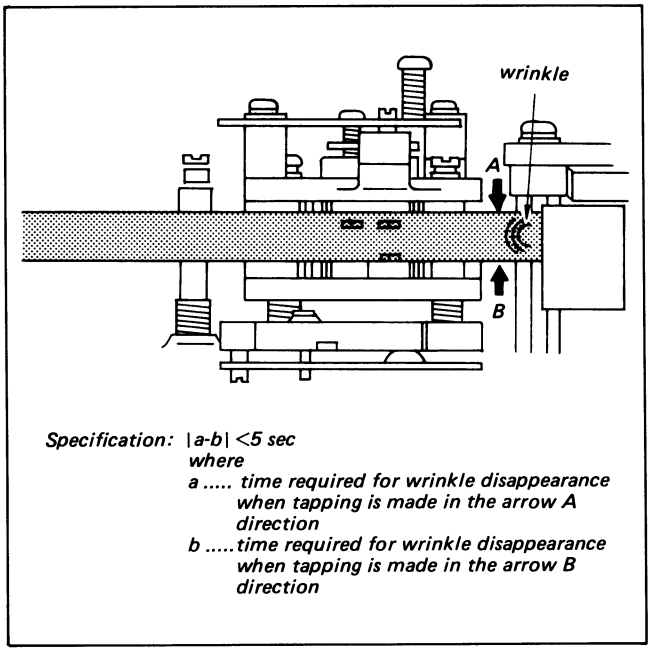

wrinkle
A
B
Specification: |a-b| <5 sec
where
a ..... time required for wrinkle disappearance when tapping is made in the arrow A direction
b .....time required for wrinkle disappearance when tapping is made in the arrow B direction

Fig. 3-31.

3-11-3. Position Adjustment of Slack Sensor Operation

1. Set up the STOP mode with the cassette. (Refer to Section 1-3.)
2. Loosen screw ① and adjust the CN-4 board position to satisfy the specification shown in Fig. 3-32.

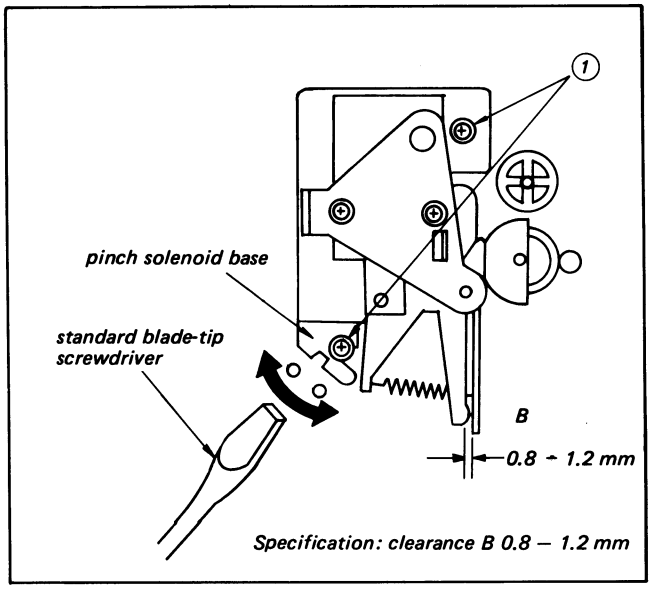


Fig. 3-30. Position adjustment of pinch solenoid

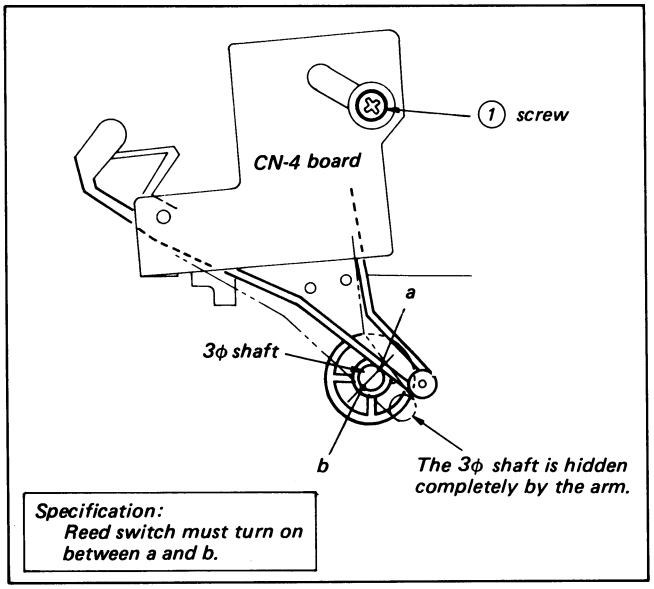


Fig. 3-32. Position adjustment of slack sensor operation

3-12. STOP SOLENOID CHECK ADJUSTMENT, AND REPLACEMENT

3-12-1. Stop Solenoid Check and Adjustment

1. Set up the STOP mode without an inserted cassette. (Refer to Section 1-3.)
2. Depress the FF button.
3. Approach a tip of a standard blade screwdriver to a point 1 mm to 3 mm away from the supply side end sensor while pushing the FF button. (See Fig. 3-33.)
4. Keep pressing the button even if the stop solenoid is energized (it is all right to remove the screwdriver from the area) and check that clearance *t* shown in Fig. 3-34 is 0.5 mm to 1.0 mm.
5. Confirm that the button is released when the stop solenoid is energized in all the modes.

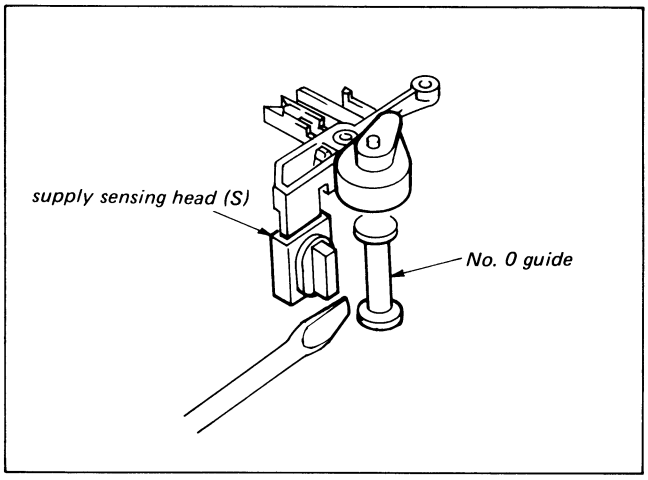


Fig. 3-33.

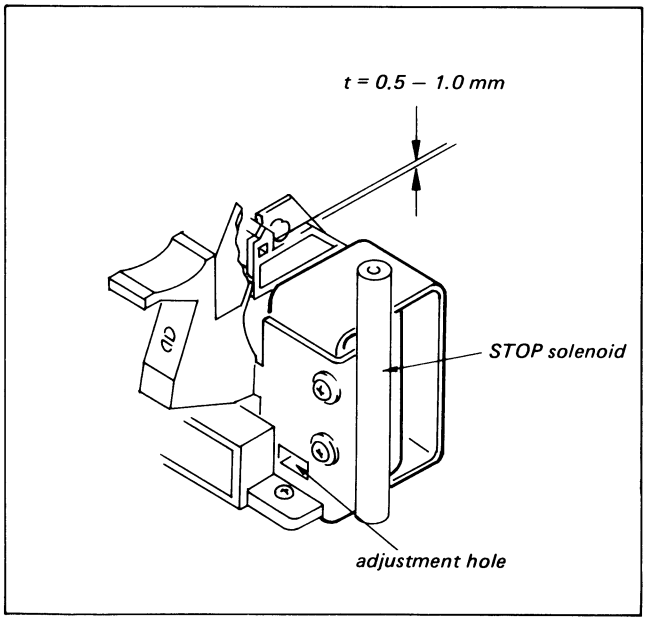


Fig. 3-34.

Adjustment Procedure when the button is not released.

6. Push the stop solenoid downward as far as it goes and secure it temporarily.
7. Perform Section 3-12-1 and energize the solenoid. Insert the standard blade-tip screwdriver into the adjustment hole and push up the solenoid gradually until clearance shown in Fig. 3-34 becomes 0.5 mm to 1.0 mm. Confirm that the stop solenoid operates securely in all the modes.

3-12-2. Stop Solenoid Replacement

1. Disconnect connector CN6401 from the SW-3 board.
2. Remove the two screws shown in Fig. 3-35 and pull the solenoid itself upward.
3. Remove the iron core from the solenoid arm.
4. Remove the iron core from a new solenoid and fix the iron core into the solenoid arm.
5. Place the solenoid itself in place while setting it to the iron core and fix it with the screws.
6. Connect connector CN6401 to the SW-3 board.
7. Perform the adjustment described in Section 3-12-1.

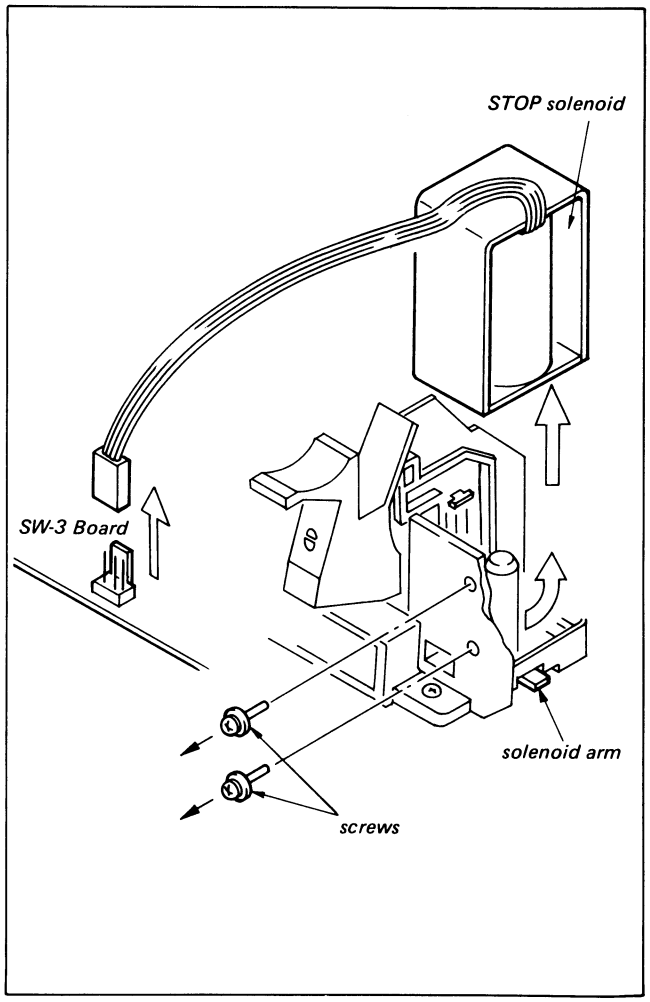


Fig. 3-35.

3-13. BUTTON SWITCH ON TIMING CHECK AND ADJUSTMENT (IN EJECT, PLAY, FF, AND REW MODES)

- The adjustment of the time that each of the EJECT, PLAY and REW buttons pushes the lever switches on the SW-3 board is necessary to combine the two operations at the optimum timing. The two operations are the mechanical operation caused by the button and the electric operations of the solenoid and the motor after the switch-on.

  EJECT & PLAY $t = 3^{+0}_{-1.5}$ mm

  FF & REW $t = 5^{+2.0}_{-0}$ mm

- The switches must turn on within the above t values. If not, insert a small Phillips-tip screwdriver into the adjustment hole and turn the screw as shown in Fig. 3-36 for the adjustment.
- Set the 3 mm or 5 mm thickness gauge as shown in Fig. 3-36. Tighten the screw, confirm that the switch turns on (by a click or by the operation start when power has been turned on in the STOP mode), tighten the screw further 90 degrees, and check that the switch does not turn off when the screwdriver is removed from the screw. If it turns off, tighten the screw further another 90 degrees.

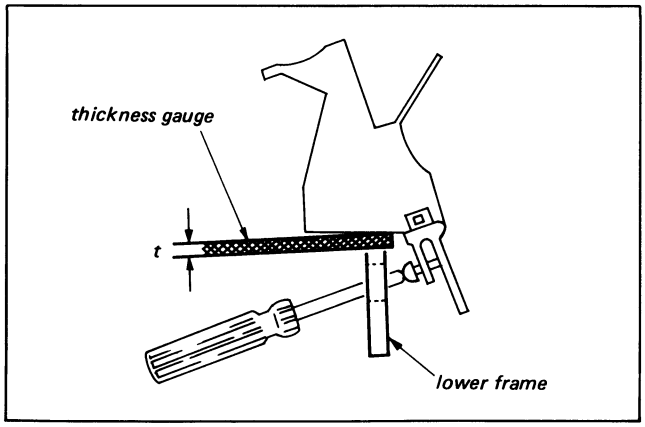


Fig. 3-36.

3-14. BUTTON BLOCK FUNCTION CHECK AND REPLACEMENT

The button block is the starting point for all the operations and its normal operation is checked here.

[Check]

1. Turn on power to the machine, insert the cassette tape, and make the machine thread the tape.
2. Press the EJECT button and check that the EJECT button is locked. Make the machine perform threading and check that the EJECT button is released with the cassette-up.
3. Make the machine perform threading and press the REW button. Check that the REW button is locked, the REW mode is set up, and the tape is rewound.
4. Press the PLAY button and check that the PLAY button is locked, the PLAY mode is set up, and the tape is running.
5. Press the FF button and check that the FF button is locked, the FF mode is set up, and the tape is running fast.
6. Press the REC button and check that the REC button is locked and the REC mode is set up. Press the REC button together with the PLAY button and check that the REC and the PLAY buttons are locked.
7. Check that the DUB button cannot be pressed alone. Press the PLAY button and the DUB button after the PLAY mode is set up. Check that the PLAY button is not released, the DUB button is locked, and the DUB mode is set up.
8. Press the FF or the REW button in the PLAY mode. Check that the PLAY button is not released, the CUE or the REVIEW mode is set up, and the set-up mode is changed to the original PLAY mode when the pressed FF or the REW button is released from the finger. Also check that the FF or the REW button is not locked in this case.
9. Press the STOP button and check that all other buttons are released from lock.
10. Press the PAUSE button and check that the PAUSE mode is set up only in the PLAY or the REC mode and the tape stops. Press the PAUSE buttons again and check that the PLAY or the REC mode is set up again and the tape starts running.
11. When a wrong operation is found, confirm that its cause is in the button block and replace the button block.

[Button Block Removal]

1. Remove the spring (① in Fig. 3-37) hooked on the FF plate. Write down the tooth on which the spring is hooked before the removal.
2. Remove connectors CN6401, 6402 (②&③ in Fig. 3-37) of the pause microswitch and the stop solenoid from the SW-3 board.
3. Remove the three screws (④, ⑤, & ⑥ in Fig. 3-37) mounting the button block and pull the button block upward. Do not catch the counter belt with the button block during the removal.

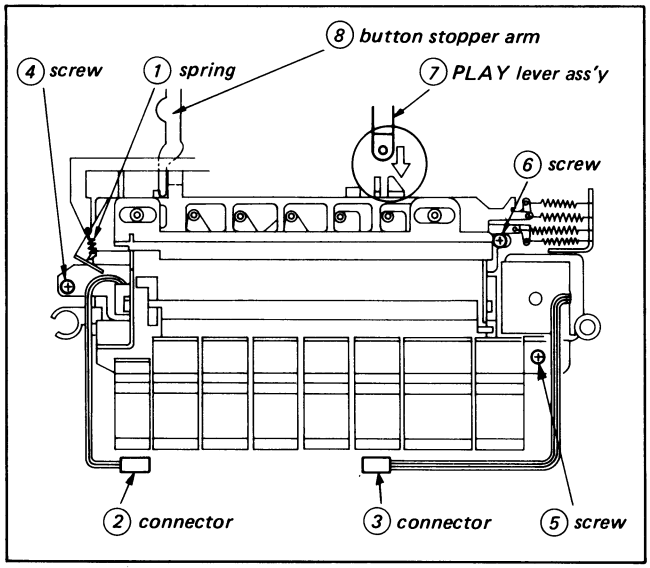


Fig. 3-37.

[Button Block Mounting]

1. Complete the threading and turn off power.
2. Confirm that the three levers (① in Fig. 3-38) of the plunger unit are slanting fully toward the upper right, viewed from the top.
3. Confirm that the button stopper arm 8 is fully rightwards. (See Fig. 3-37.)
4. Bring down the button block from the topside so that the tips of the four levers (② in Fig. 3-38) on the SW-3 board fit the respective holes on the back side of the button block, position the button block so that the tooth of the slide plate No. 4 gears into the pin (⑦ in Fig. 3-37) on the drive block assembly. Check that there is not any play in the up and down directions and fasten the button block.

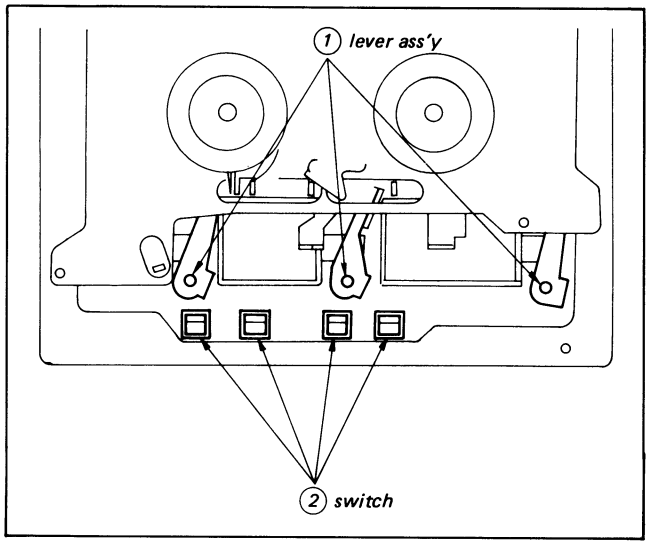


Fig. 3-38.

3-15. POSITION ADJUSTMENT OF THREADING END SWITCH

- Prior to this adjustment, the following adjustments must be completed.

  3-8-5. Clearance adjustment of cassette lift assembly arm
  3-8-6. Clearance adjustment of ring arm
  3-8-7. Check of unthreading completion

1. Turn the threading ring by hand and stop it at the point immediately before the threading completion position.
2. Loosen screw ④ and adjust the position of microswitch ③ so that microswitch ③ turns on before gear pulley hold arm ① moves from the groove of lock arm ②, while turning the threading ring counterclockwise (↺) slowly by hand. Confirm the turning-on of the microswitch with a click.
3. Adjust the position further so that the clearance between the actuator of microswitch ③ shown in Fig. 3-39 and the microswitch satisfies the specification (within 0.5mm) when the threading ring is turned counterclockwise (↺) beyond the threading completion point.
4. Repeat Steps 2 and 3 for confirmation.

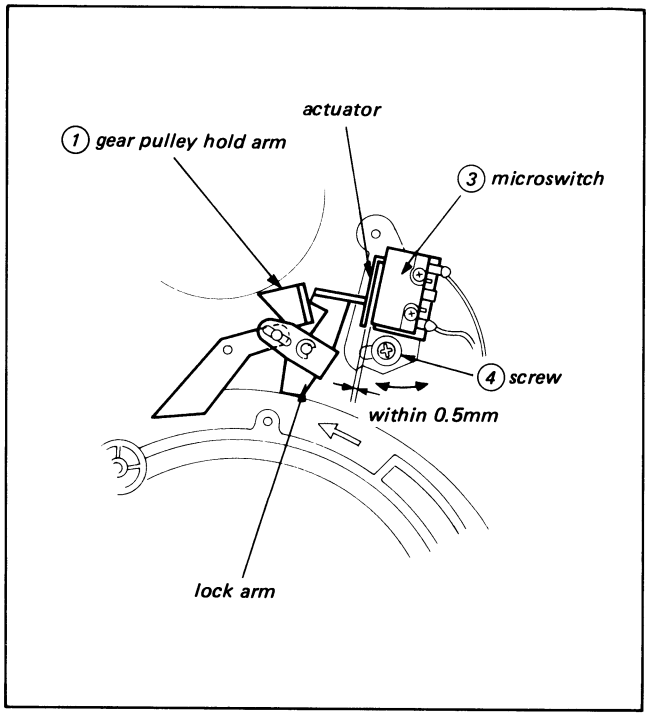


Fig. 3-39. Position adjustment of threading end switch

3-16. CHECK OF TAKE-UP TORQUE

- Since sufficient take-up torque cannot be obtained at the last section of the tape if the take-up torque is below the specified value, tape slackness is caused at the capstan shaft point and sometimes the slack sensor operates.
- The take-up torque tends to increase gradully due to aging.

1. Rewind the tape a little and set up the PLAY mode (for the playback of the very last section of the tape) after the auto-stop at the tape end in the FAST FWD mode. Confirm that the tape runs without any slackness at the capstan shaft area. If the tape slackens, perform the following adjustments.
2. Clean the take-up reel table assembly, the FWD idler assembly, and the FWD belt with a piece of cloth dampened with isopropyl alcohol.
3. Stop the operation of the slack sensor. (Refer to section 1-4.)
4. Attach the reel table tension gauge (Tool Kit Ref. No. J-4) on the take-up reel table as shown in Fig. 3-40.
5. Pull out the string from the reel table tension gauge about 30 cm (12 inches) and hook the sector type tension gauge (50g full scale, Tool Kit Ref. No. J-6) on the end of string.
6. Set up the PLAY mode.
7. Bring the sector type gauge toward the take-up reel table at a speed of approx. 2cm/sec. (8 inch/sec.) as shown in Fig. 3-40. Confirm that the gauge reading is within the specification. If not, replace the FWD limiter assembly and make the check again.

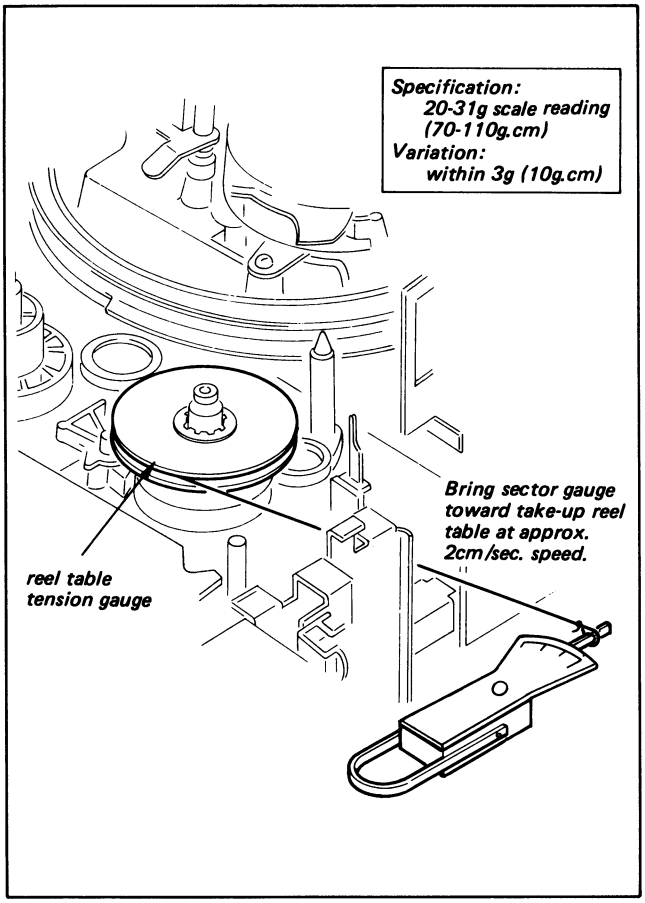


Fig. 3-40. Check of take-up torque

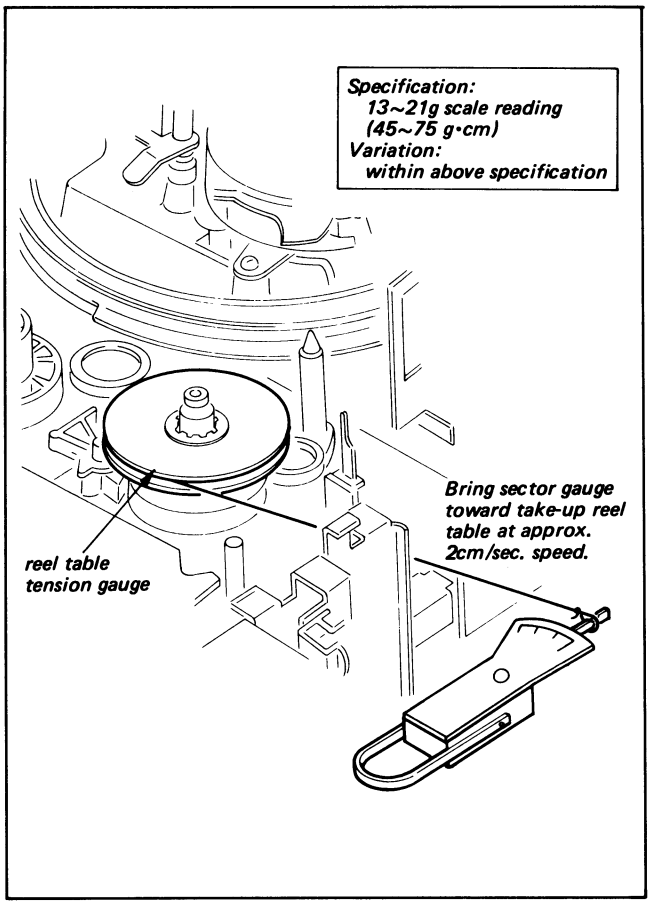


Fig. 3-41. Check of cassette eject torque

3-17. CHECK OF CASSETTE EJECT TORQUE

- The tape is taken up by the take-up reel table in the cassette EJECT mode. The take-up reel table is driven via the belt by the DC motor, while the threading ring unthreads.
- If the cassette eject torque is below the specification, only the threading ring performs the unthreading operation while the tape is not pulled back into the cassette, and the tape can be damaged.

1. Clean the take-up reel table, the E idler assembly, and the EJECT belt with a piece of cloth dampened with isopropyl alcohol.
2. Attach the reel table tension gauge (Tool Kit Ref. No. J-4) as shown in Fig. 3-41.)
3. Pull out the string of the gauge about 30 cm (12 inches) and hook the sector type gauge (50g full scale, Tool Kit Ref. No. J-6) on the end of the string.
4. Set up the EJECT mode.
5. Bring the sector type gauge toward the take-up reel table at a speed of approx. 2cm/sec. during the unthreading as shown in Fig. 3-41. Confirm that the gauge reading is within the specification. If not, replace the E limiter assembly (X-3659-301-0) of the threading unit section and make the confirmation again.

3-18. CHECK OF BRAKE TORQUE

- This machine has the supply brake, take-up brake, soft brake, and pause brake to stop the taking-up of the tape in the PAUSE mode. These brakes operate as follows.

Reel table ass'y / Mode	Supply side	Take-up side
Cassette EJECT mode	Supply and soft brakes are ON.	Only take-up brake is ON.
Threading mode	Only soft brake is ON. (It is normal that the supply reel rotates a little, supplying tape.) Soft brake torque; 15 to 30 g.cm. Reel table rotational direction is CW (↻).	Free (Tape is supplied from take-up side.)
STOP mode	Supply and soft brakes are ON. Reel table rotational direction CW (↻): 100 to 500g.cm Reel table rotational direction CCW (↺): 40 to 130g.cm	Only main brake is ON. Reel table rotational direction CW (↻): 20 to 60g.cm Reel table rotational direction CCW (↺): 60 to 500g.cm

FF mode	Only soft brake is ON.	Free (Tape is taken up to take-up side.)
REW mode	Free	Free
PLAY mode	Only FWD back tension brake band is ON.	Free (Tape is taken up to take-up side.)
REC PAUSE mode & PLAY PAUSE mode	FWD back tension brake is ON.	Take-up and pause brakes are ON.
Unthreading mode	Only soft brake is ON. (It is normal that supply reel rotates a little, supplying tape.)	Free (Tape is taken up to take-up side.)

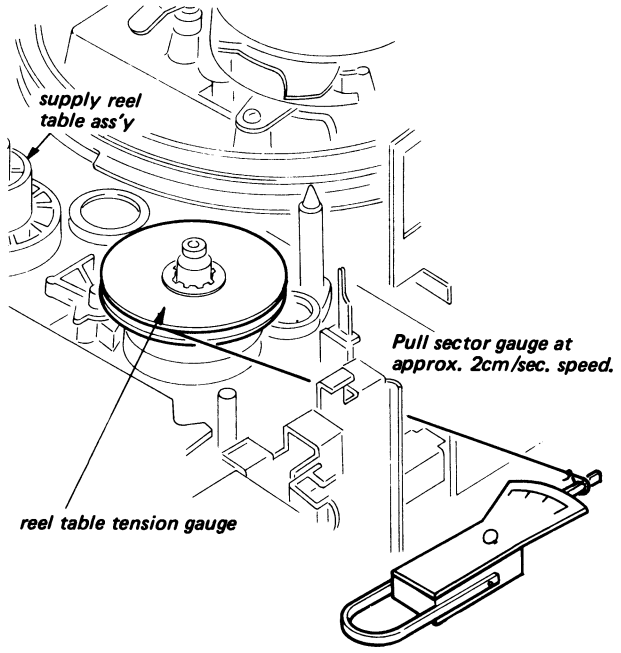
3 -18-1. Check of Supply and Take-up Brake Operations

- When the tape slackens in when the mode is changed to STOP from PLAY and to STOP from REWIND, perform the check and adjustment, following the steps below.
- Since the slackness tends to occur when a wound diameter of the tape on a reel table is small, the check must be made in such a state.

1. Insert the cassette and set up the initial state of taking-up of the tape. (Rewind the tape and cue its beginning.)
2. Repeat the operation, changing the mode from PLAY to STOP two or three times and confirm that there is no tape slackness. If the tape slackens, perform steps 5 and 6 for adjustment.
3. Set-up the condition where the tape is about to be completely wound on the take-up reel. (Fast forward the tape and stop the tape movement at its end section.)
4. Repeat the operation, changing the mode from REWIND to STOP two or three times and confirm that no tape slackness occurs. If the tape slackens, perform Steps 5 and 6 for adjustment.
5. Remove the reel table assembly and clean the surface of the reel table assembly and the brake shoe with a piece of cloth dampened with isopropyl alcohol.

3-18-2. Check of Supply and Take-up Brake Torque

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Attach the reel table tension gauge (Tool Kit Ref. No. J-4) to the take-up reel table as shown in Fig. 3-42 and hook the sector type gauge (100g full scale, Tool Kit Ref. No. J-7) to the end of the string. Pull the sector type gauge at a speed of approx. 2 cm/sec. and read the gauge value.



Note: This figure shows the take-up torque check. For supply brake torque check, set reel table tension gauge on supply reel table.

Fig. 3-42. Check of supply and take-up brake torque

Specification

- When supply reel table ass'y rotates CW (↻): 100 to 500g.cm (Scale value is 29 to 143g.)
- When supply reel table ass'y rotates CCW (↺): 40 to 130g.cm (Scale value is 11 to 37g.)
- When take-up reel table ass'y rotates CW (↻): 20 to 60g.cm (Scale value is 6 to 17g.)
- When take-up reel table ass'y rotates CCW (↺): 60 to 500g.cm (Scale value is 17 to 143g.)

3-18-3. Check and Adjustment of Soft Brake Torque

1. Push the cassette detector lever by hand and release the lever during the threading. (In this condition, the supply and take-up brakes are released.)
2. Mount the reel table tension gauge (Tool Kit Ref. No. J-4) on the supply reel table as shown in Fig. 3-43 and hook the sector type guage (50g full scale, Tool Kit Ref. No. J-6) to the end of the string of the tension gauge.
3. Pull the sector type gauge at a speed of approx. 2cm/sec. and confirm that the gauge reading is within the specification. If the specification is not satisfied, change the position where the spring is hooked onto the soft brake and the F slide plate for adjustment and perform Steps 2 and 3.

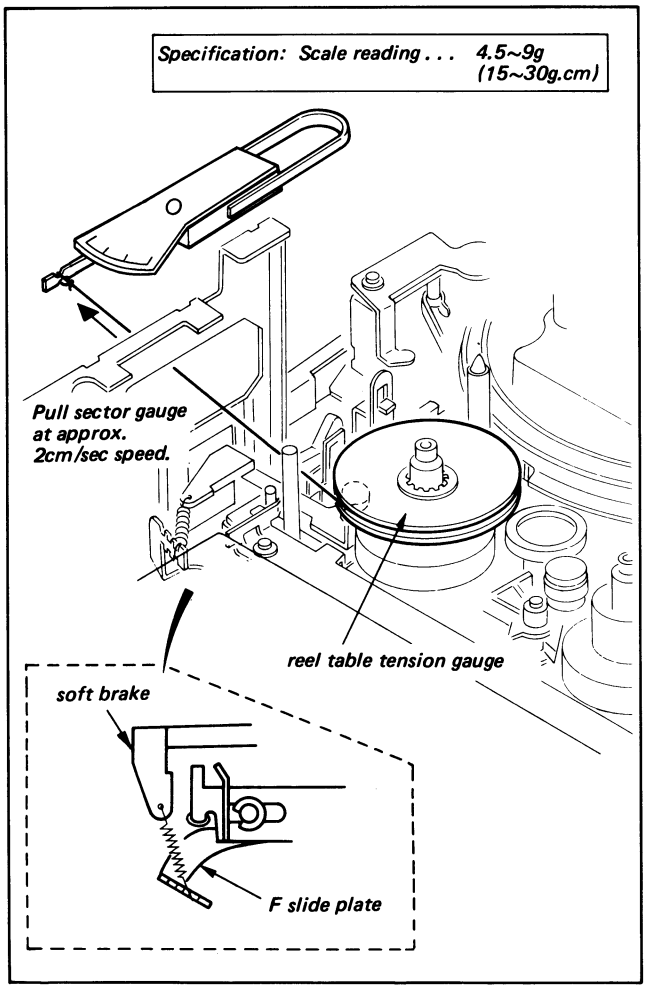

Specification: Scale reading... 4.5~9g (15~30g.cm)
Pull sector gauge at approx. 2cm/sec speed.
reel table tension gauge
soft brake
F slide plate

Fig. 3-43. Check of soft brake torque

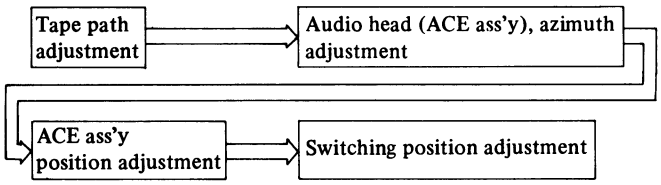
3-19. ADJUSTMENT OF FWD BACK TENSION

- The ideal measurement of the FWD back tension is to measure it under the same conditions as during the actual tape running state. The simple measurement procedure of the FWD back tension is described here. The measurement error due to the different measurement procedure is corrected in the specification.

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Place the FWD back tension jig (Tool Kit Ref. No. J-5) on the supply reel table assembly and thread the tape as shown in Fig. 3-44. Hook the sector type gauge (100g full scale, Tool Kit Ref. No. J-7) to the end of the tape.
3. Set up the PLAY mode.
4. Pull the sector type gauge at a speed of approx. 2cm/sec. and confirm that the gauge reading is within the specification. If not, perform Steps 5 and 6.
5. Loosen the screw mounting the BT adjusting plate and move the BT adjusting plate in the direction shown by the arrow for the adjustment.
6. Repeat Steps 2 to 4 again.

3-20. ADJUSTMENT OF TRACKING

- Sequence of tracking adjustment


Tape path adjustment
Audio head (ACE ass'y), azimuth adjustment
ACE ass'y position adjustment
Switching position adjustment

[Preparation]

1. Fixtures and Tools Required:
   Alignment tape (KR5-1S)
   Dual trace oscilloscope
   Inspection mirror (Tool Kit Ref. No. J-9)
   Methanol or Isopropyl Alcohol (Tool Kit Ref. No. J-12)
   Chamois (Tool Kit Ref. No. J-13)
   3 mm flat tip screwdriver
2. Oscilloscope connection

RF envelope waveform:	TP-5004	..... RP-1 board
External trigger:	TP-5003	..... RP-1 board
AUDIO OUT:	TP-2066	..... SA-5 board
VIDEO OUT:	TP-1011	..... YC-4 board
Switching waveform:	TP-5003	..... RP-1 board

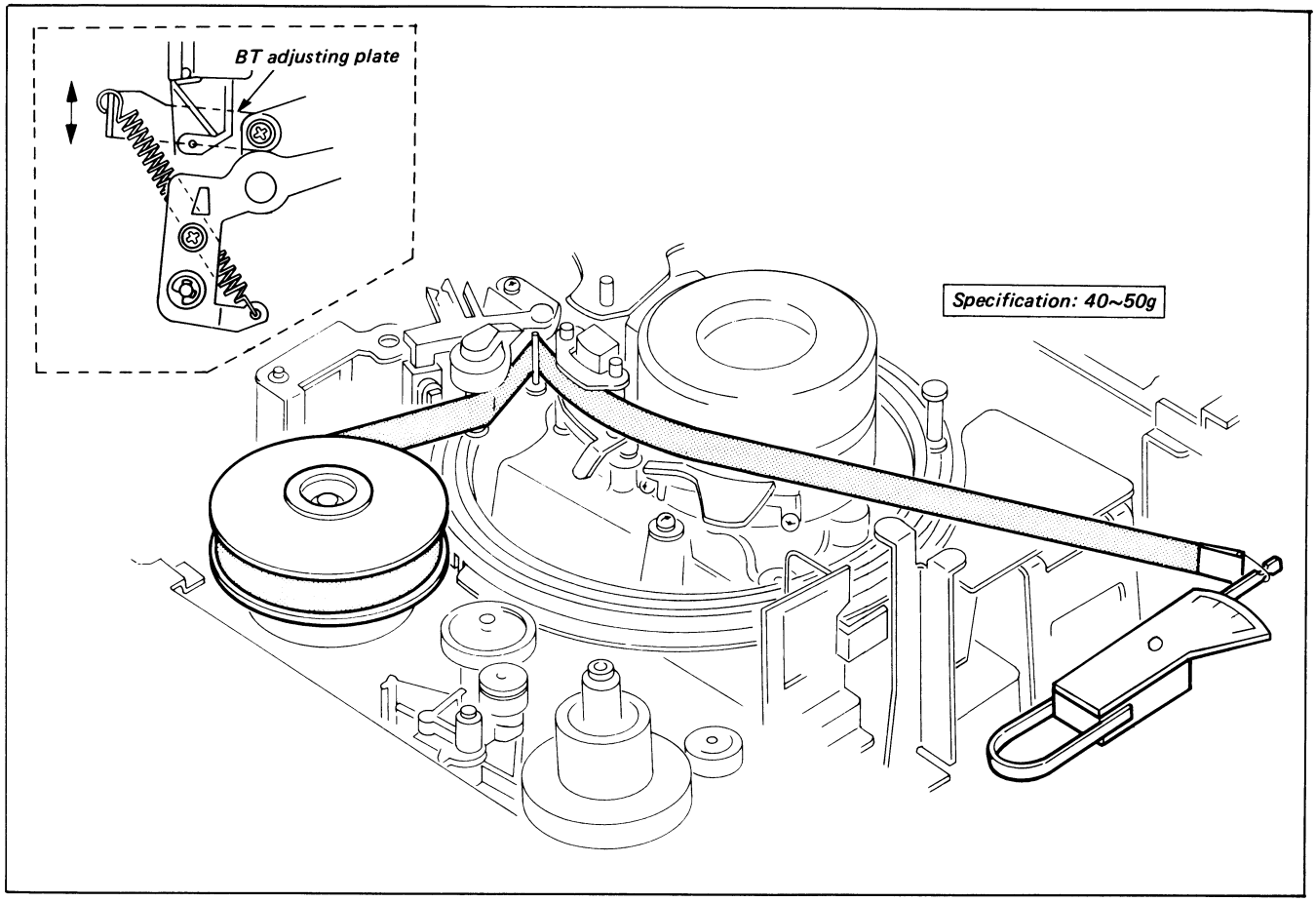


Fig. 3-44. Adjustment of FWD back tension

4. Location of circuit boards

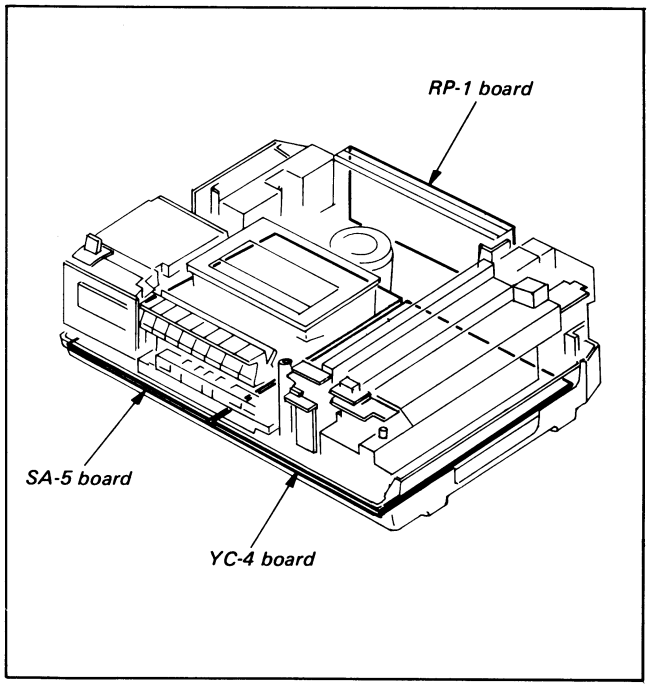


Fig. 3-45. Location of circuit boards

5. Location tape guides

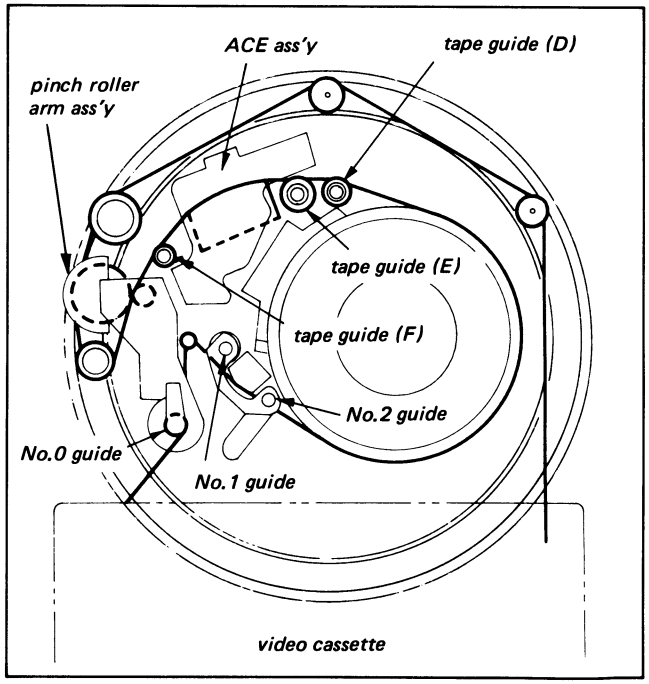


Fig. 3-46. Location of tape guides

3-20-1. Adjustment of Tape Path

- Perform this adjustment carefully because poor adjustment reduces tape interchangeability and picture quality.

1. Clean the tape movement faces (the tape guide, drum, capstan and pinch roller) with chamois dampened with methanol or isopropyl alcohol.
2. Connect the oscilloscope to TP-5004 on the RP-1 board and the external trigger to TP-5003.
3. Play back the 1 MHz segment of the alignment tape (KR5-1S).
4. Confirm that the RF output waveform envelope on the oscilloscope screen increases and decreases, while remaining flat, when the TRACKING control knob is turned to the left and the right from its center detent position. If the RF waveform does not increase and decrease while remaining flat, perform Step 6 for the adjustment.
5. Confirm that the fluctuation and the tape-to-head contact satisfy the specification shown in Fig. 3-47. If they do not, perform Step 6 for the adjustment.

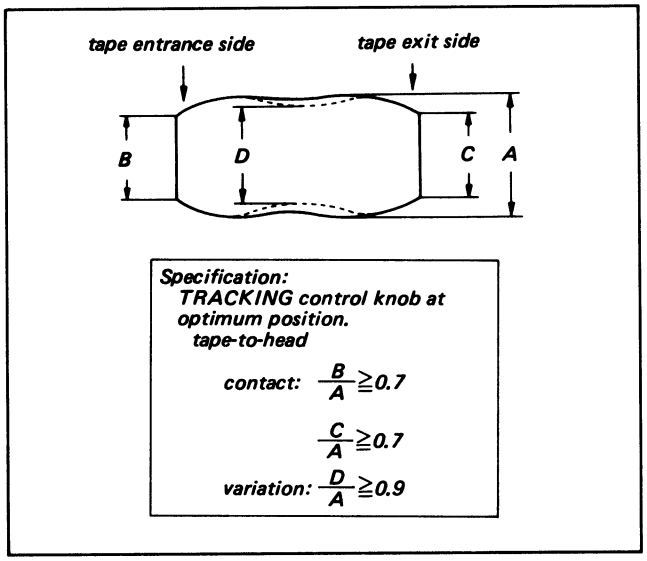


Fig. 3-47. Adjustment of tape path

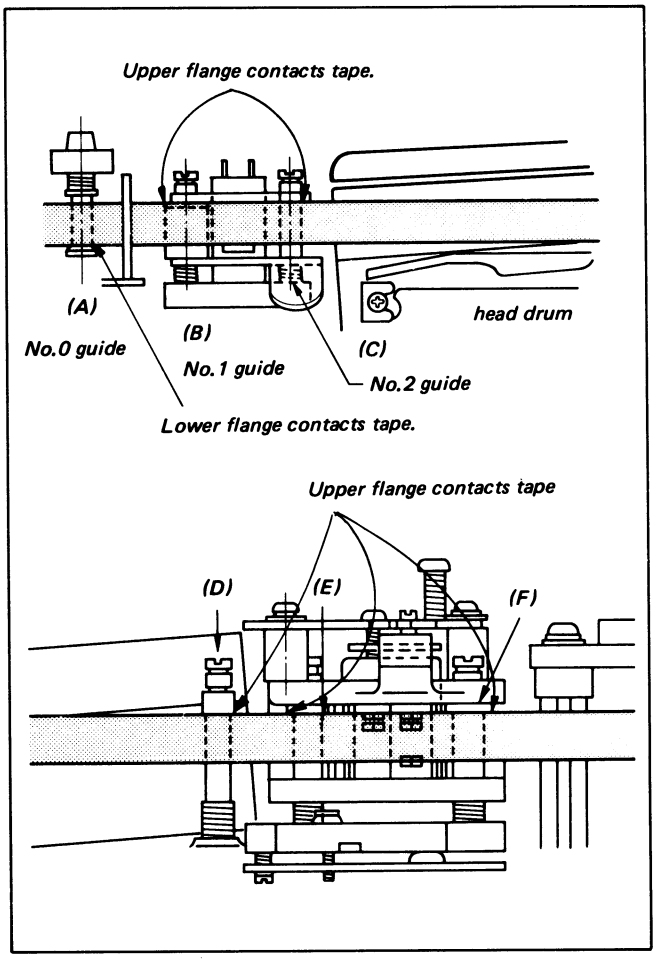


Fig. 3-49. Adjustment of tape path

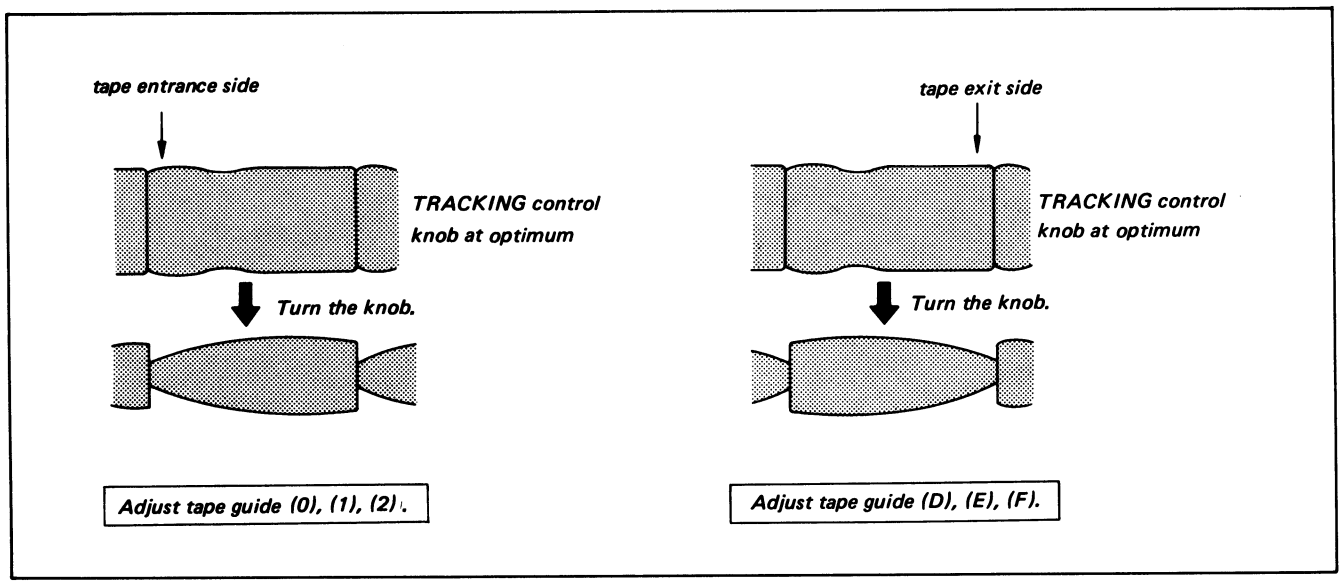

tape entrance side
TRACKING control knob at optimum
Turn the knob.
Adjust tape guide (0), (1), (2).
tape exit side
TRACKING control knob at optimum
Turn the knob.
Adjust tape guide (D), (E), (F).

Fig. 3-48. Adjustment of tape path

6. When the waveform at the tape entrance side is not flat as shown in Fig. 3-48) for the clockwise and counterclockwise turning of the TRACKING control knob from center, detent position, adjust the heights of tape guides (0), (1), and (2). When the waveform at the tape exit side is not flat, adjust the heights of tape guides (D), (E), and (F). The height adjustment must be performed so that the tape contacts the drum heads, there is no curl at the flange of each tape guide, the upper or lower flanges contact the tape as shown in Fig. 3-49, and the RF waveform is flat.

Note: The construction of the ACE assembly enables the assembly to be adjusted so that its top plate is perpendicular to the face of the moving tape as a whole, but this "Zenith" adjustment is not necessary except after ACE assembly replacement.
Since tape guide (D) regulates the movement of the tape around the drum exit, raise tape guide (D) about 0.5 mm before the adjustment of the tape path on the exit side. Then lower tape guide (D) to the point immediately before the RF waveform varies, with no curls after the tape path adjustment.

3-20-2. Adjustment of Exit Side Tracking after ACE Assembly Replacement

1. The ACE assembly can be removed if the three screws shown in Fig. 3-50 are removed.

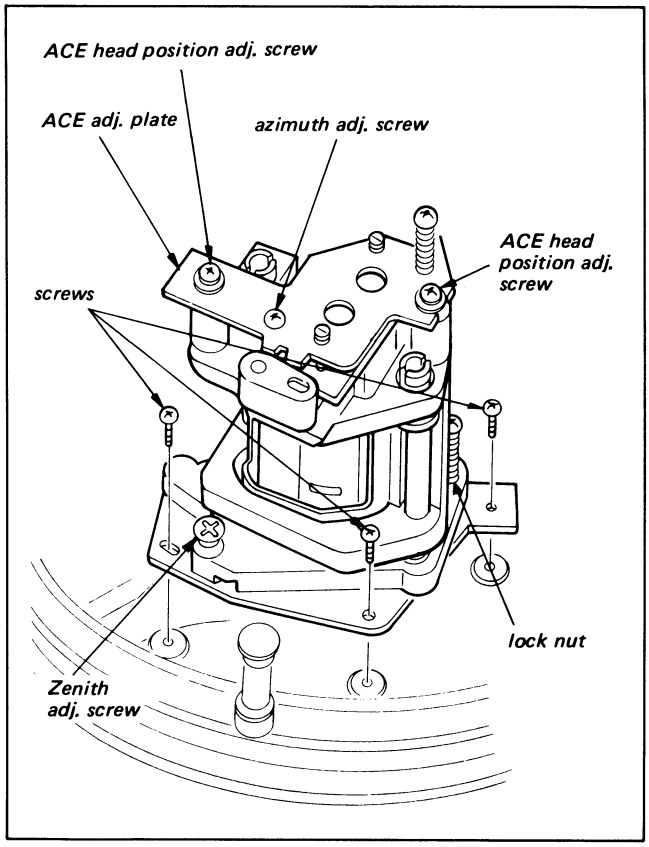


Fig. 3-50. Removal of ACE assembly

2. Perform the adjustment following Step 3 after the completion of the replacement.
3. Raise the tape guide (D) shown in Fig. 3-49 by 0.5 mm. (Turn the nut one turn.)
4. Play back the 1 MHz segment of the alignment tape (KR5-1S). Confirm that the RF wave output (see Fig. 3-47) satisfies the specification and there is no curl on the tape edge contacting the tape guide. Confirm that the RF waveform varied from the flat state when the tape guides (E) and (F) are raised and adjust the heights of the tape guides so that the waveform output becomes flat.
5. When the waveform does not vary if the tape guides (E) and (F) are raised in Step 4 or when the waveform does not become flat if the tape guides are lowered, perform the adjustment, following the procedure below.
   (i) Loosen the lock nut shown in Fig. 3-50.
   (ii) Turn the zenith adjusting screw 30 degrees counterclockwise (↺) and tighten it clockwise (↻).
   (iii) Perform Step 4 again. If the specification is not satisfied, perform Step 5 again. Since the ACE assembly was adjusted perpendicularly when assembled at the factory, do not turn the zenith adjusting screw more than 60 degrees to the right and left from the original position.
   (iv) After the adjustment, tighten the lock nut until a slight resistance for the tightening is felt and confirm that the specification in Step 4 is satisfied.
6. When there is an edge curl at the tape contacting the tape guide in Step 4, perform the adjustment, following the procedure below.
   (i) Loosen the lock nut shown in Fig. 3-50.
   (ii) Tighten the zenith adjusting screw only 15 degrees.
   (iii) Perform Step 4 again. If the specification is not satisfied, perform Steps 5 and 6 again, but do not turn the zenith adjusting screw to the right and left more than 60 degrees from its original position.
   (iv) Tighten the lock nut until a slight resistance is felt after the adjustment. Confirm that the specification in Step 4 is satisfied.

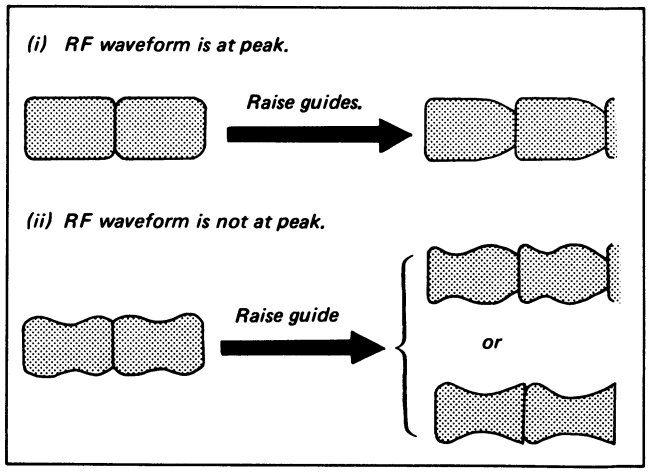


Fig. 3-51. Adjustment of exit side tracking after ACE assembly replacement

3-20-3. Audio Head Azimuth Adjustment

[Connection of Relative Equipment]

The connections of the equipments to the input/output terminals are shown in Fig. 3-52.

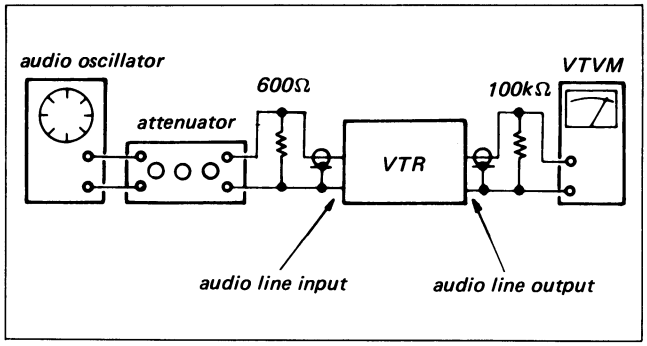


Fig. 3-52. Connections

1. Terminate the audio line output terminal with a 100 kΩ resistor and connect a VTVM.
2. Play back the 5 kHz signal segment of the alignment tape.
3. Adjust the azimuth adjustment screw on the audio head for a maximum VTVM reading. (See Fig. 3-50.)

   Note: Loosen azimuth adjustment screw before the adjustment and tighten it after the completion.

3-20-4. Position Adjustment of ACE Assembly

- This adjustment includes the mechanical head mounting position adjustment and the electrical tracking control center adjustment.
- The adjustment sequence is to perform the tracking control center adjustment and then the mechanical adjustment of the head mounting position. If this sequence is reversed, poor tracking occurs.

1. Connect a dual-trace oscilloscope as follows.
   CH-1 . . . . . TP-5004 (RP-1 board)
   CH-2 . . . . . TP-2066 (SA-5 board)
   Ext trigger . . . . TP-5003 (RP-1 board)
2. Play back the βII mode "Tracking" segment of alignment tape KR5-1S. (See Fig. 3-53.)
3. Set the tracking control to center click point, and confirm that output waveform level is maximum and 0 level point of audio signal appears at Bch waveform as shown in Fig. 3-53. If the specification is not satisfied, perform the following step 4.

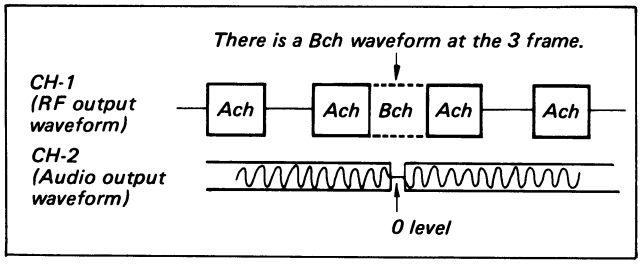


Fig. 3-53. Position adjustment of ACE assembly (1)

4. Perform the tracking control center adjustment.
   [Refer to section 4-3-2(2).]
5. Set the TRACKING control knob to its center detent point and play back the "Tracking" segment of the alignment tape (KR5-1S).
6. Loosen the two position adjusting screws of the ACE head and adjust the cut-out section of section A for maximum RF output waveform and 0 level point of audio signal appears at Bch waveform.

   Note: Perform the adjustment so that the center of the cut-out section of the A section will almost the center of the hole.

7. Play back the βII mode segment of the alignment tape and confirm the picture appearance.
8. Tighten the position adjusting screw of the ACE head.

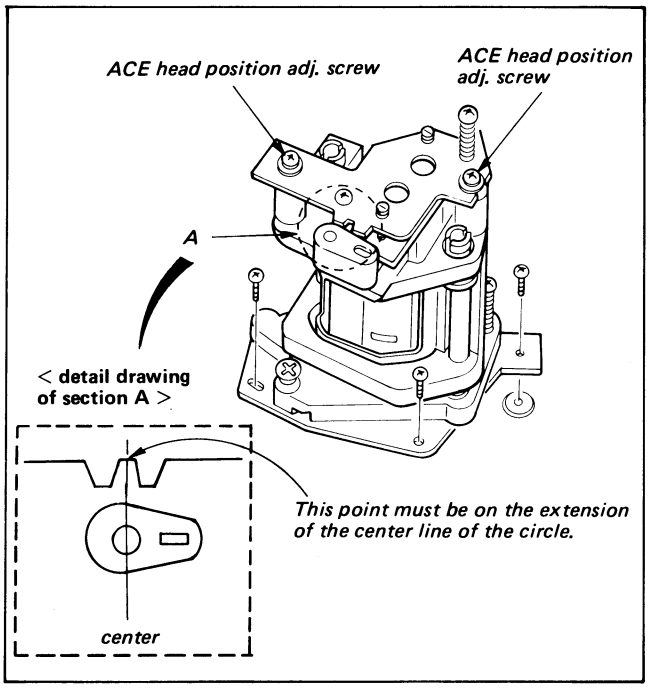


Fig. 3-54. Position adjustment of ACE assembly (2)

3-20-5. Video Head Dihedral Adjustment

- Generally this adjustment is not necessary except after the video head disk replacement.

  Note: The dihedron of a video head disk for replacement purposes was adjusted precisely with a microscope at the factory and the readjustment is usually not necessary.

- The ACE assembly position adjustment has been completed prior to this dihedral adjustment.
- The judgment of the video head dihedron must be performed in the condition that the monoscope signal segment of the alignment tape (KR5-1S) is played back and the TRACKING control knob is set to the center detent position. (See Fig. 3-55.)

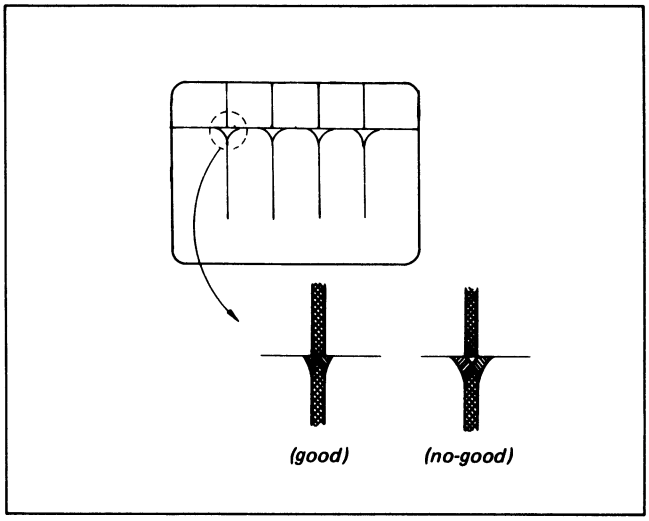


Fig. 3-55.

- When the dihedron is no-good, the preparation of the video head dihedral adjustment is to install two dihedral adjusting screws in the holes close to the small mark (•) shown in Fig. 3-56 and tighten them until the screw heads are level with the top surface of the video head disk. (If the screws are not tightened until their heads become level with the surface, the upper drum of the video head disk is caught by the adjusting screw heads and the video head disk cannot rotate. If the screws are tightened excessively, the head base is moved and the dihedral distortion becomes larger.)

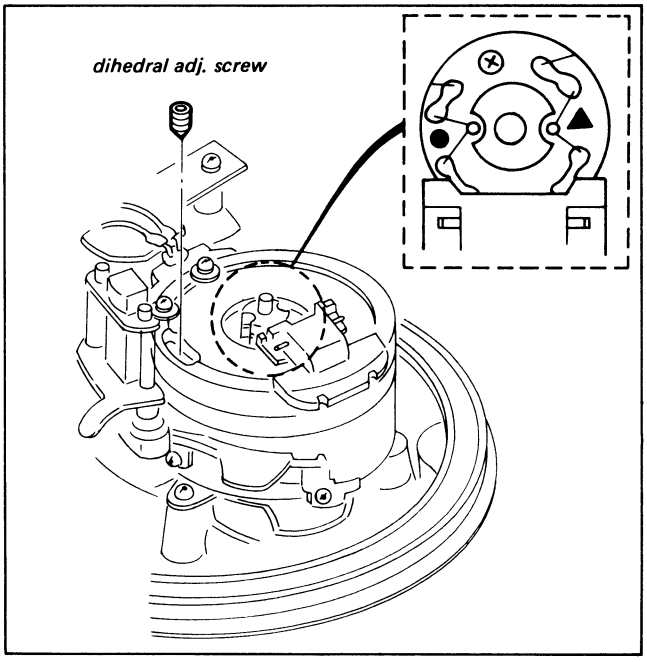


Fig. 3-56.

When the dihedron is no-good;

(1) When the split becomes small for the clockwise turn of the TRACKING control knob, the B head shifts by C in the arrow direction as shown in Fig. 3-57 and is tracing the magnetic pattern on the tape. The adjusting screw in adjustment hole E shown in the figure must be tightened further to shift the B head in the left direction until the good dihedron shown in Fig. 3-55 is obtained.
Set the TRACKING control knob to the center detent point.

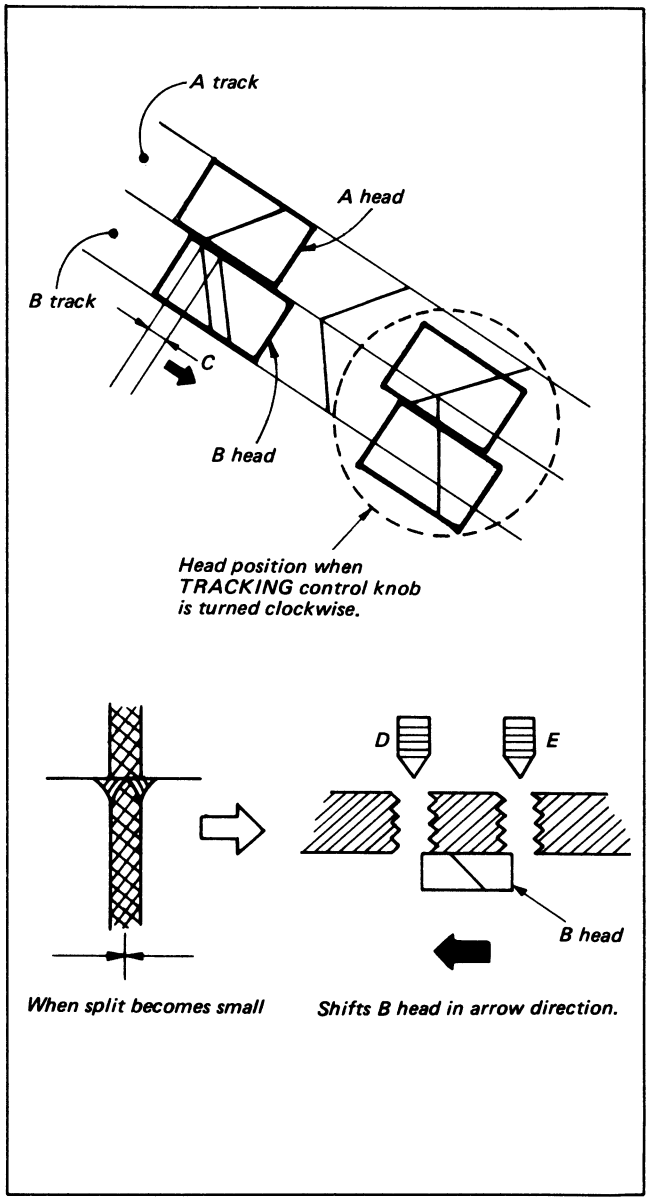


Fig. 3-57.

(2) When the split becomes large for the clockwise turn of the TRACKING control knob, the B head shifts by C in the arrow direction as shown in Fig. 3-58 and is tracing the magnetic pattern. The adjusting screw in adjustment hole D shown in the figure, must be tightened further to shift the B head in the right direction until the good dihedron shown in Fig. 3-55 is obtained.
Set the TRACKING control knob to the center detent point.

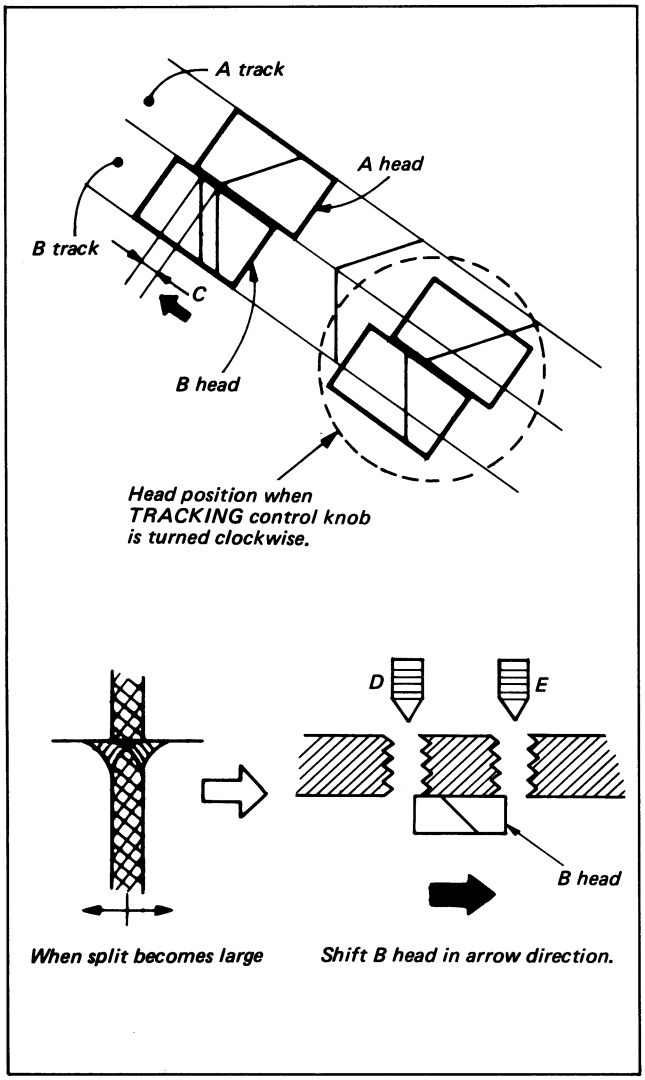


Fig. 3-58.

(3) Remove the adjusting screws after the completion of the adjustment and check the dihedron again.

3-21. FUNCTION SOLENOID ADJUSTMENT AND REPLACEMENT

3-21-1. SL Solenoid Check and Adjustment

The SL (select) solenoid is a part of the deceleration mechanism to change the rotation number of the midway pulley assembly in the BETASCAN mode switches the clutch gear. If the stroke of the SL solenoid is not set suitably, the correct decelerating operation is not expected.

[Check]

1. Stand the machine its left side down. Open the YC-4 and SA-5 boards. (Refer to Section 1-1-4.)
2. Insert the tape and make the machine thread it. Turn off power after the completion of the threading.
3. Push the PLAY key together with the FF key and clip these keys with a clip as shown in Fig. 3-59.

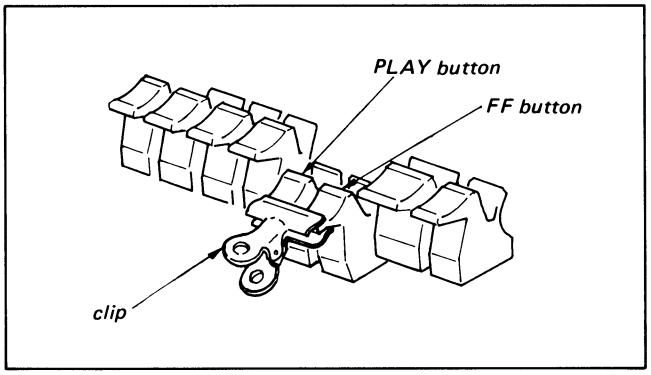


Fig. 3-59.

4. Remove the FF belt. (See Fig. 3-60.)
5. Turn on power. The SL solenoid is placed in the energized state.
6. Check the gearing of the clutch gear into the clutch metal at section A with using the inspection mirror (Jig. Ref. No. J-9) as shown in Fig. 3-60.

   Note: If the clutch gear is not gearing into the clutch metal correctly, turn off power, rotate the clutch gear with hand to the position where it gears into the clutch metal, and turn on power.

7. Check that there is no clearance as shown in Fig. 3-60 when the clutch gear gears into the clutch metal correctly at section A.
   If there is a clearance or the gear gears into the metal correctly but the solenoid core is not pulled fully, perform Step 8 and its following steps.

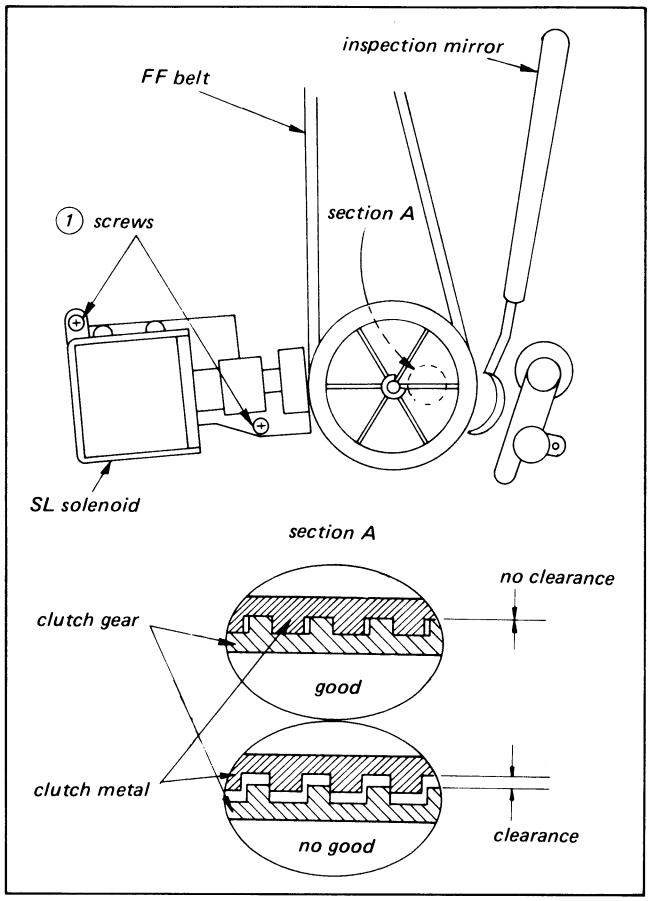


Fig. 3-60.

[Adjustment]

8. Loosen two screws (1) shown in Fig. 3-61 and move the SL solenoid in the direction shown by arrow A.
9. Move the SL solenoid in the arrow B direction so that the specification shown in Fig. 3-60 is satisfied, and fix the two screws (1) . (See Fig. 3-61.)
10. Install the FF belt, insert the cassette, and check the movement of the SL solenoid.

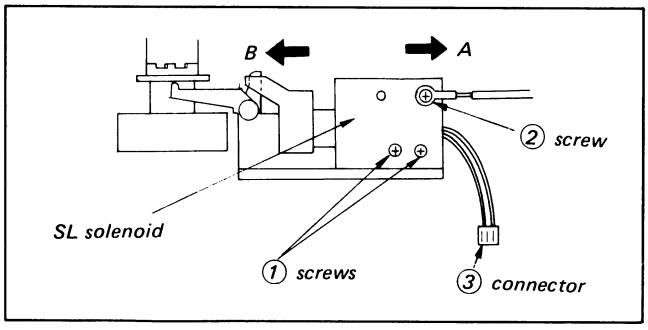


Fig. 3-61.

3-21-2. SL Solenoid Replacement

- The SL solenoid must be replaced when the suitable position of the solenoid cannot be obtained in the adjustment in Section 3-21-1.

1. Remove two screws (1) shown in Fig. 3-60.
2. Remove screw (2) and connector (3) shown in Fig. 3-61. Then the solenoid can be removed.
3. After mounting the solenoid, perform "SL Solenoid Check and Adjustment", Section 3-21-1.

3-21-3. Clutch Pulley Block Assembly Replacement

- The clutch gear or the clutch pulley block assembly must be replaced when the clutch gear shown in Fig. 3-62 does not rotate smoothly.

1. Remove the SL solenoid as did in Section 3-21-2.
2. Remove the FF belt.
3. Remove the cassette-up block assembly.
4. Bend the projections of the midway pulley assembly as shown in Fig. 3-62 and pull the clutch pulley block assembly in the direction indicated by arrow A. Mount the replacement clutch pulley block assembly.

   Note: Do not lose polyslider on the shaft.
5. Perform "SL Solenoid Check and Adjustment", Section 3-21-1, after the mounting.

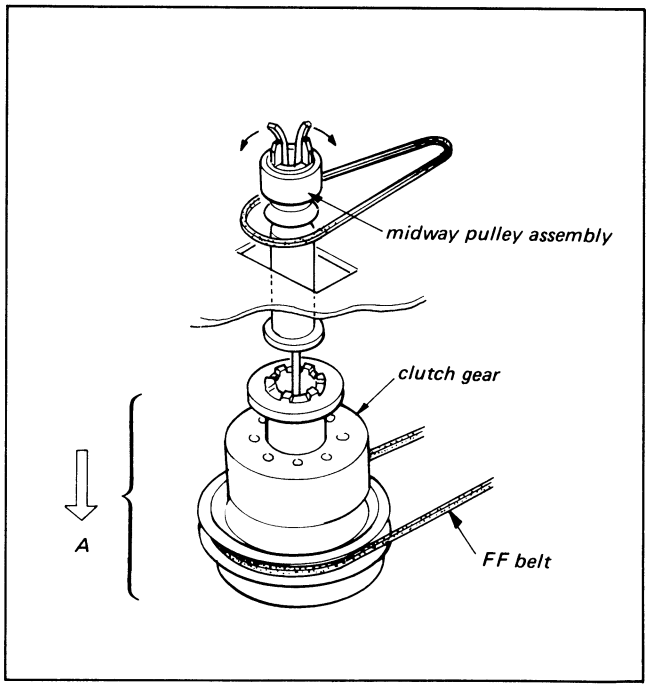


Fig. 3-62.

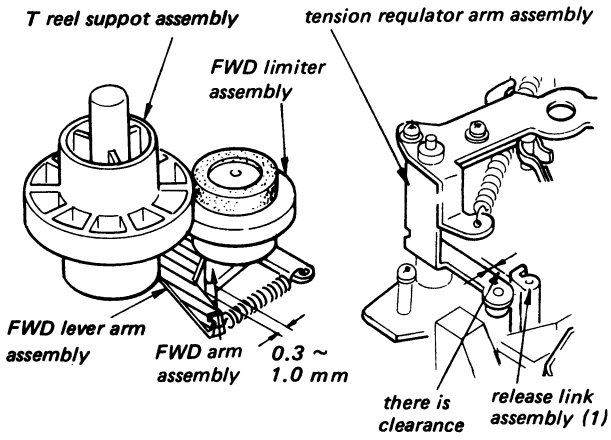
3-21-4. PLAY, FF and REW Solenoid Checks and Adjustments

- The PLAY, FF and REW solenoids, each has an important role for driving the tape and a careful adjustment is necessary.

[Check]

1. Set up the STOP mode without the cassette inserted. (Refer to Section 1-3.)
2. Check that the each stroke of the PLAY, FF and REW solenoids satisfies the specification shown in Fig. 3-63. If the specification is not satisfied, perform Step 3 and the following steps.

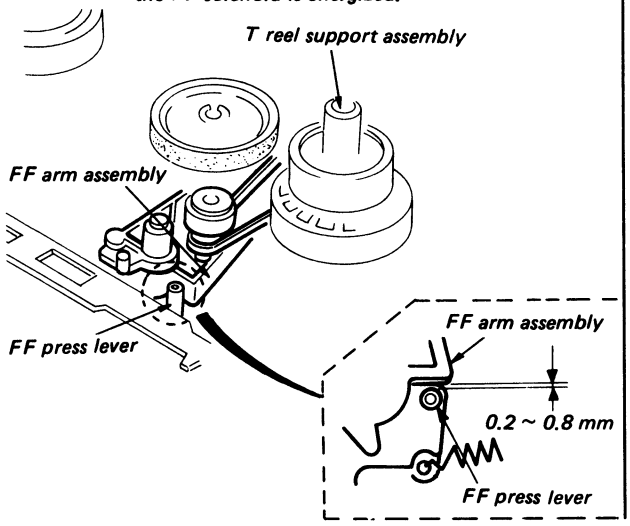
(1) FWD solenoid stroke



Specification: There must be a clearance of 0.3 to 1.0mm between the FWD limiter assembly shaft and the FWD lever assembly. There must be a clearance between the tension regulator arm assembly and the release link assembly (1).

(2) FF solenoid stroke

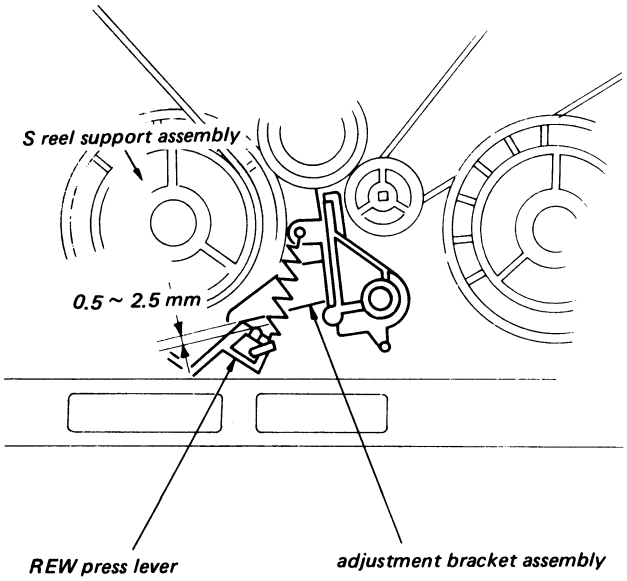
Note: *Check the specification in the state that the FF button is pressed halfway, and the FF solenoid is energized.*



Specification: There must be a clearance of 0.2 to 0.8mm between the FF press lever and the FF arm arm assembly.

(3) REW solenoid stroke

Note: *Check the specification in the state that the REW button is pressed halfway, and the REW solenoid is energized.*



Specification: There must be a clearance of 0.5 to 2.5mm between the adjustment bracket assembly and the REW press lever.

Fig. 3-63.

[Adjustment]

3. Stand the machine its left side down. Open the YC-4 and the SA-5 boards. (Refer to Section 1-1-4.)
4. Loosen the screw fixing the solenoid required to be adjusted as shown in Fig. 3-64. Tighten the screw temporary while pushing up the solenoid in the direction shown by arrow A.
5. Press the mode button corresponding to the solenoid to be adjusted, insert a flat-head screwdriver into the position shown in Fig. 3-64, and lower the solenoid gradually in the direction shown by arrow B until the specification shown in Fig. 3-63 is satisfied.

   Note: The check must be done when the FF or the REW key is pressed halfway, and the solenoid is energized.
6. Tighten the screw of the solenoid.
7. Insert the tape into the machine and check the operation.

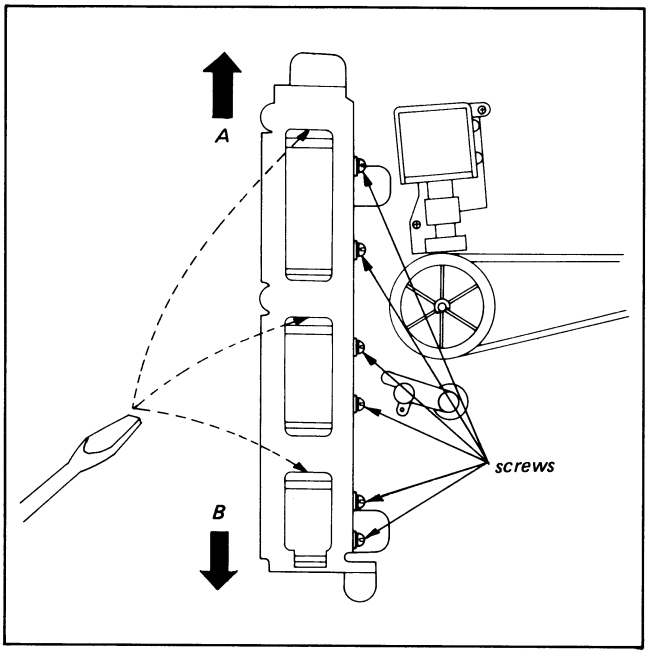


Fig. 3-64.

3-21-5. PLAY, FF and REW Solenoid Replacements

1. Remove the five screws shown in Fig. 3-65.
2. Move the tuner block in the direction shown by the arrow. (See Fig. 3-65.)

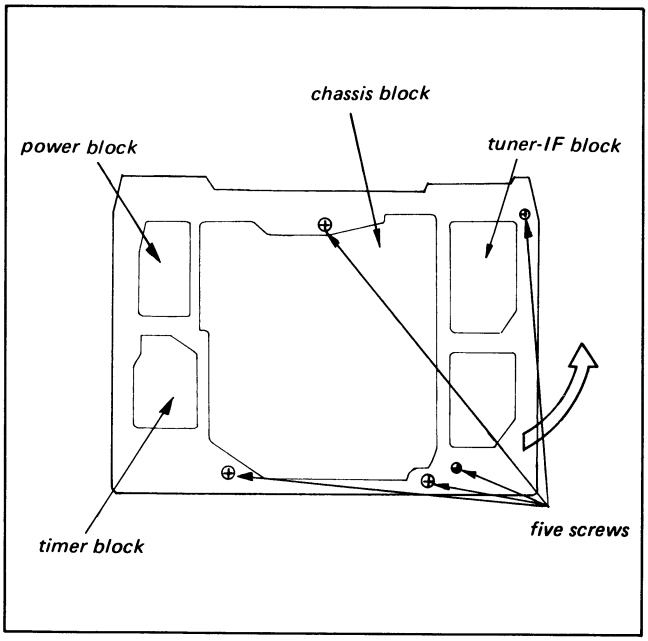


Fig. 3-65.

3. Pull up the drum base edge close to you and keep it from falling by a stick in 20cm length or a screwdriver as shown in Fig. 3-66.
4. Remove three screws (1) and two connectors (2) and (3) shown in Fig. 3-66. The PLAY, FF and REW solenoids can be replaced.

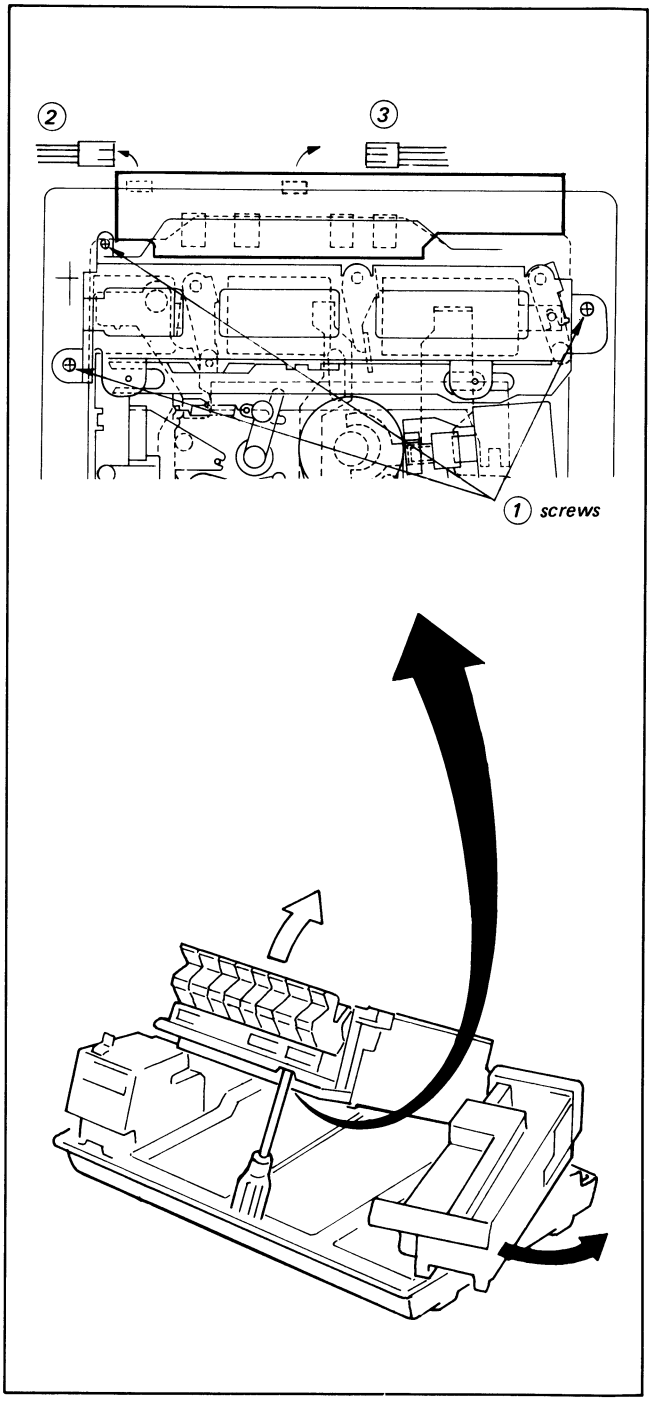


Fig. 3-66.

5. Note the three points stated in Fig. 3-67 for mounting the solenoid on the drum base.

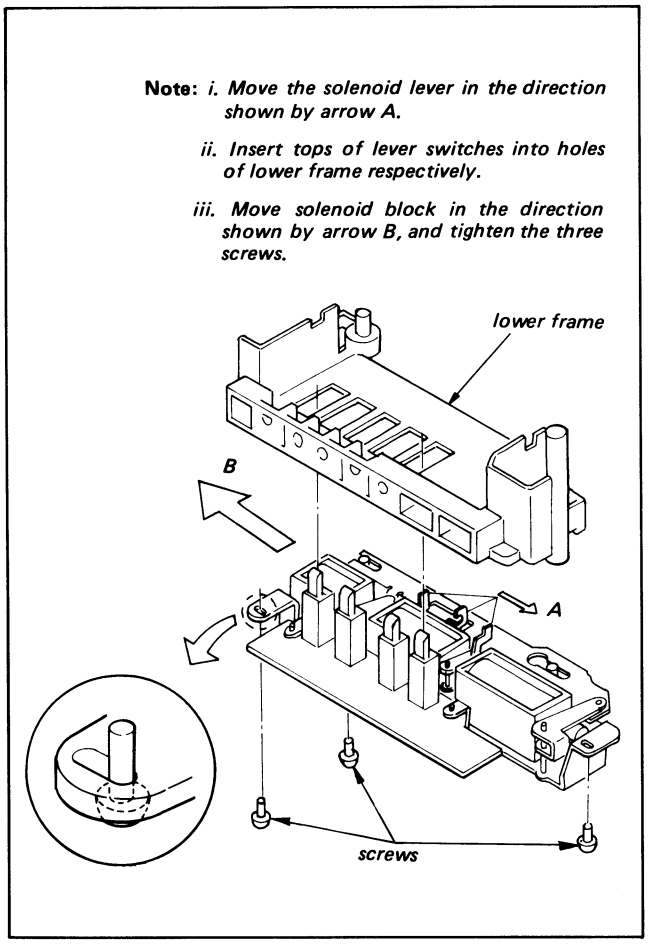

Note: i. Move the solenoid lever in the direction shown by arrow A.
ii. Insert tops of lever switches into holes of lower frame respectively.
iii. Move solenoid block in the direction shown by arrow B, and tighten the three screws.
lower frame
B
A
screws

Fig. 3-67.

6. Tighten the three screws fixing the drum base while pulling the drum base toward you. (See Fig. 3-66.)

7. Perform "PLAY, FF, and REW Solenoid Checks and Adjustments" in Section 3-21-4 after the assembling.

SECTION 4
ELECTRICAL ALIGNMENT

This section provides all necessary information and instructions for complete alignment of the electronic circuits in this machine.

EQUIPMENT REQUIRED

(1) Color TV receiver

(2) Oscilloscope Single or Dual-trace, Bandwidth . more than 15 MHz with delay mode

(3) Frequency counter (more than four digits)

(4) NTSC pattern generator

(5) VTVM

(6) VOM (20 kΩ/V)

(7) Audio signal generator

(8) Audio attenuator

(9) Alignment tape Type KR5-1S Code No. 8-969-995-71

(10) Alignment tool (adjusting screwdriver for semi-fixed resistor coil)

[Preparatory Set-up for Alignment]

For these alignment procedures involving use of a video input signal the NTSC pattern generator is to be connected to the VHF antenna terminals of the SL-5600. This RF signal is processed by the tuner and I.F. circuits within the VTR. It is important that the video out signal from the I.F. circuit satisfies the specifications. The video signal must be checked with an oscilloscope connected to TP-1 on the YC-4 board. Verify that the sync signal amplitude is approx. 0.3 Vp-p that the video signal amplitude is approx. 0.7 Vp-p. Adjust the fine tuning while observing the signal on the scope and on the TV screen so that the color burst amplitude becomes approx. 0.3V ± 0.1Vp-p. Also confirm that there are no spikes observed at the sync signal portion of the signal.

The video (color bar) signal for the alignment is shown in Fig. 4-1.

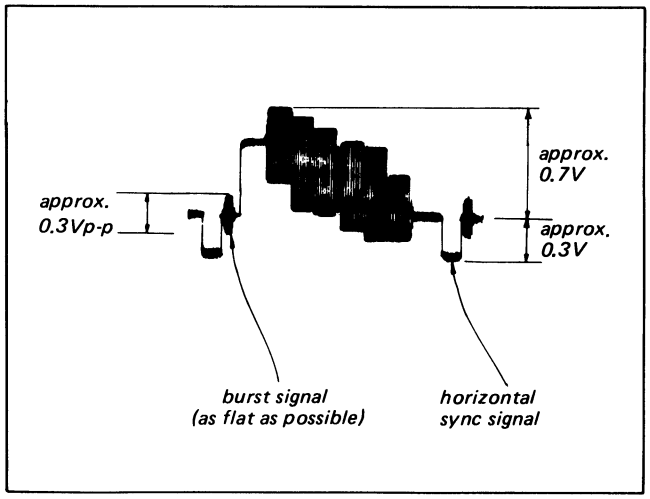


Fig. 4-1. Video (color bar) signal

[Alignment Tape]

KR5-1S

Tape speed	Video signal	Audio signal	Playing time
20.0mm/sec. (βII)	Color bars	3kHz –5dB	4 min. for each segment
	Monoscope (dihedral)	333Hz –25dB	
	RF sweep	5kHz –25dB	
	1MHz (A ch)	1kHz –5dB	
13.3mm/sec. (βIII)	Color bars	3kHz –5dB	
	Monoscope	5kHz –25dB	
	RF sweep	333Hz –5dB	

[Alignment tool for VR]

Semi-fixed variable resistors and inductances should be adjusted with the alignment tool, exclusively prepared for the adjustment of the components. A common screwdriver is too large for adjusting the components from the conductor side of a printed circuit board. (See Fig. 4-2.)

The metal blade of the alignment tool is used for variable resistors and trimmer capacitors, and the plastic tip for variable inductances.

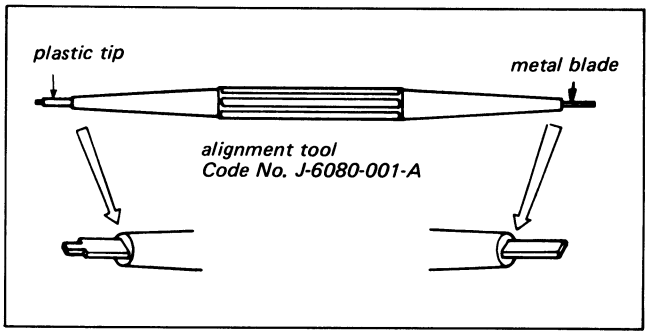


Fig. 4-2. Alignment tool

[Required Levels and Impedances of Input and Output]

VIDEO

Input . . . . . VIDEO IN;
phono-type connector
1.0 Vp-p 75 ohms,
unbalanced, sync negative

Output . . . . . VIDEO OUT;
phono-type connector
1.0 Vp-p 75 ohms
unbalanced, sync negative

AUDIO

Input . . . . . AUDIO IN;
mini jack, 100 k ohms, –10 dB
MIC:
mini jack, –60 dB, suitable for
microphone with 600-ohm
impedance

Output . . . . . AUDIO OUT;
mini jack, less than 10 k ohms,
–5 dB (100 k ohm load), unbalanced

[Color Bar Signal]

The 75% color bar signal recorded on the alignment tape is shown in Fig. 4-3.

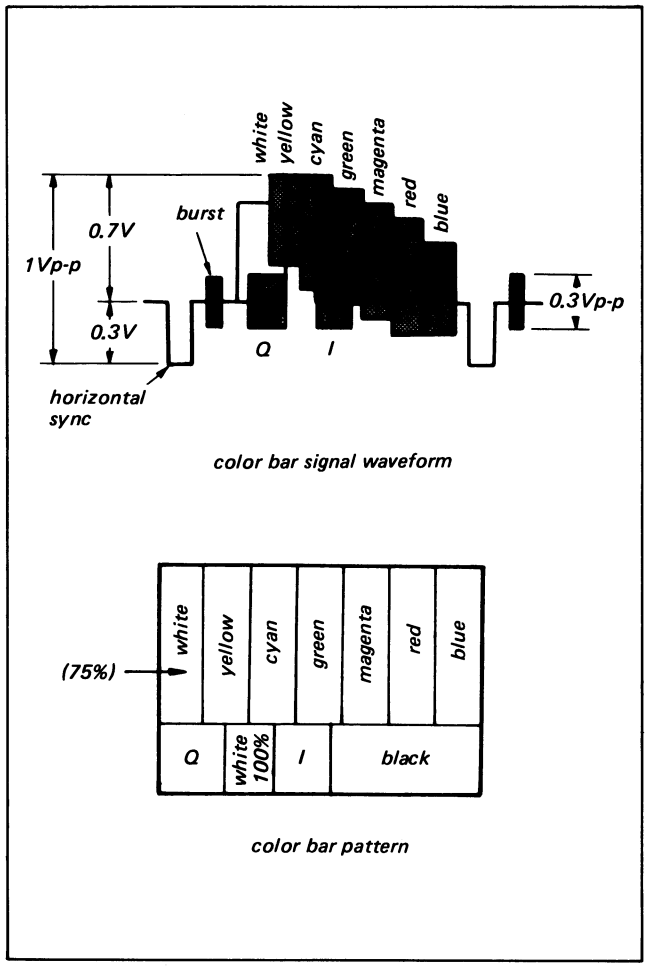
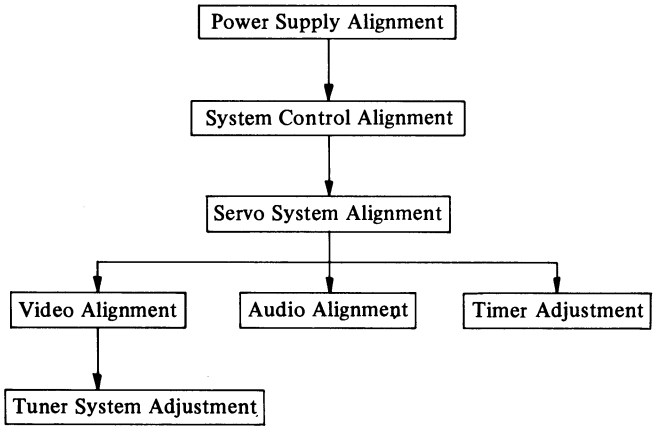


Fig. 4-3. 75% color bar signal recorded on the alignment tape

[Alignment Sequence]

The alignment should be performed following the sequence below.



4-1. POWER SUPPLY ALIGNMENT AND CHECK (PS-9 board)

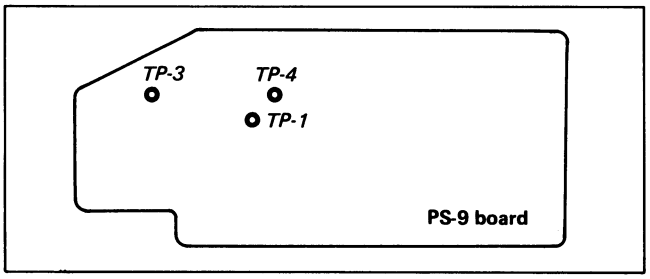


Fig. 4-4. Test Points on PS-9 board

1. **REG 12 V Adjustment**
   (1) Check that the input voltage is 120 V ac ±10%.
   (2) Connect the VOM to TP1.
   (3) Adjust RV001 for a 12 V ± 0.1 V reading.

2. **EVER 12V Check**
   (1) Connect the VOM to TP4.
   (2) Check that the reading is 12V ± 0.8 V.

3. **SYS 12 V Check**
   (1) Check that the voltage at TP1 is 12 V.
   (2) Connect the VOM to TP3.
   (3) Check that the reading is 12 V ± 1 V.

4-2. SYSTEM CONTROL ALIGNMENT AND CHECK (SY-12 board)

1. **Clock Oscillating Frequency Adjustment**
   (1) Connect the frequency counter to pin 42 of IC1.
   (2) Adjust L003 for a reading of 400 kHz ± 20 kHz.

   Note: L003 is mounted on the component side of the board which must be turned over for access to this adjustment. In addition, coil L003 is under a sub-board that must be loosened to adjust L003. Alternate method for measuring clock frequency, using oscilloscope:

   (1) Connect scope to pin 42 of IC001.
   (2) Sine wave on scope screen should have a cycle period of 2,380 to 2,630 micro-seconds.

2. **Threading Check**
   (1) Insert the cassette.
   (2) Check that the threading operation is performed correctly.
   Threading time: about 4 seconds

3. **Unthreading Check**
   Check that the unthreading operation is performed when the EJECT button is pressed, the cassette lift assembly lifts, the EJECT button lock is released, and the EJECT mode completes.
   Unthreading time: about 5 second

4. **PLAY Mode Check**
   Check that the FWD solenoid is energized when the PLAY button is pressed, the drum motor starts rotation, and the pinch solenoid is energized.
   Pinch solenoid delay time: about 0.5 second

5. **BETA SCAN Mode Check**
   (1) Set up the PLAY mode.
   (2) Check that the FF/CUE solenoid is energized during the time that FF button is kept depressed and the pinch solenoid is deenergized.
   (3) Check that the FF/CUE solenoid is deenergized, the pinch solenoid is energized when the FF button is released and the PLAY mode is set up again.
   (4) Check that the REW/REVIEW solenoid is energized and the pinch solenoid is de-energized during the time that the REW button is kept depressed.
   (5) Check that the REW/REVIEW solenoid is deenergized and the pinch solenoid is energized when the REW button is released, and the PLAY mode set up again.
   (6) Check that the STOP mode is set up and the PLAY button lock is released after the operations, PLAY-BETA SCAN-PLAY-BETA SCAN . . . . . are repeated more than 15 times during a five second period.
   (7) Check that the machine operates as checked in Check Items (1) to (6) when the Beta Scan control unit is used in combination with the machine.

6. **PAUSE Mode Check**
   (1) Check that the pinch solenoid is de-energized when the PAUSE button is depressed, the brake solenoid is energized and the reel table rotation stops.
   (2) Check that the pinch solenoid is energized when the PAUSE button is depressed again, the brake solenoid is de-energized, and the reel table starts rotation.
   (3) Check that Check Items (1) and (2) are satisfied when the Beta Scan control unit is used together with the machine.

7. **AUTO-STOP Check**
   (1) Check that the AUTO-STOP mode is set up at the metal tape portion (end of tape), the button lock is released, and the STOP mode is set up.
   (2) Check that the button lock is released when a piece of iron is placed near the FWD sensor in the PLAY, FF, and REC modes, and the REW sensor in the REW mode and the STOP mode is set up.

8. **Counter Memory Check**
   (1) Turn on the MEMORY ON/OFF switch.
   (2) Set up the REW mode.
   (3) Check that the AUTO-STOP is set up and the button lock is released when the tape counter reaches 9999.
   (4) Check that the REW mode is set up and the tape is re-wound when the REW button is depressed again.

9. **Index Check**
   (1) Set the SEARCH switch to INDEX and record a signal.
   (2) Depress the REW button.
   (3) Make sure that the REW button is automatically released at beginning portion of recorded signal.
   (4) Depress the REW button again.
   (5) Make sure that rewind is performed.

10. **Slack Sensor Check**
   (1) Check that the AUTO-STOP is set up when the tape is slackened intentionally and the key lock is released.
   (2) Repeat Check (1) two more times. Check that the mode other than the EJECT is not set up after repeating Check (1) three times in total. Even if the key is locked, the mode corresponding to the key is not set up.
   (3) The reset is set up when the EJECT button is depressed once and any mode can be set up again.

4-3. SERVO SYSTEM ALIGNMENT

4-3-1. Drum Servo System Alignment

1. **Drum Free Speed Adjustment (SA-5 board)**
   (1) Insert a cassette and set up the REC mode Beta II or Beta III.
   (2) Connect the oscilloscope CH-1 probe to pin 6 of IC1 and its CH-2 probe to pin 7 of IC1.
   (3) Check that the RF waveform is locked as shown in Fig. 4-5.

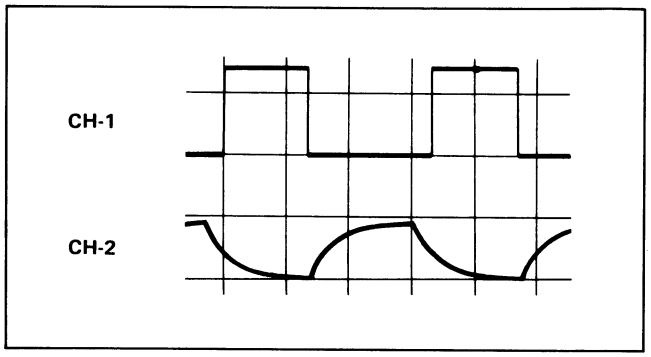


Fig. 4-5. Drum free speed adjustment

   (4) Connect the oscilloscope to TP002. Input: DC range
   (5) Adjust RV8 for a DC level of 5.2 V ± 0.3 V. (See Fig. 4-6.)

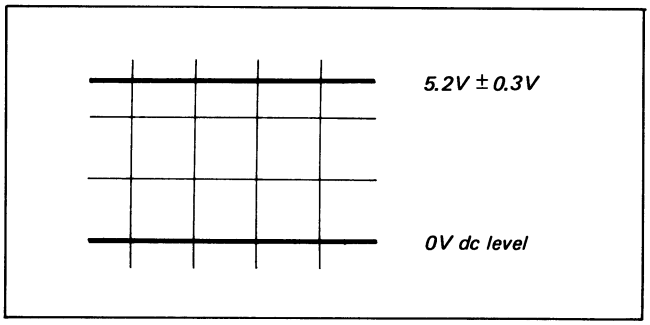


Fig. 4-6. Drum free speed adjustment

2. **RF Switching Position Adjustment (YC-4, RP-1 & SA-5 boards)**
   (1) Play back the color bar (βII mode) segment.
   (2) Connect the oscilloscope to **TP4** on the RP-1 board.
   (3) Adjust the TRACKING knob so that the waveform amplitude becomes maximum. (See Fig. 4-7.)

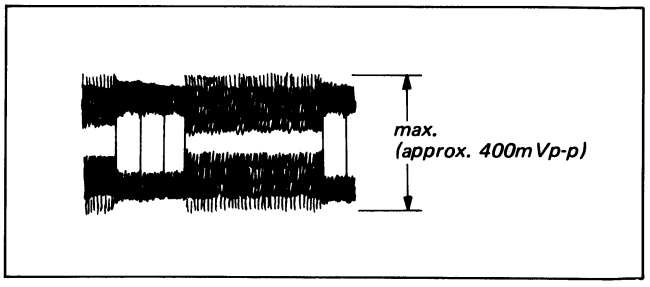


Fig. 4-7. RF output waveform

(4) Connect the oscilloscope CH-1 probe to TP001 on the SA-5 board and the CH-2 probe to TP11 on the YC-4 board.
(5) Adjust **RV2** on the **SA-5** board so that the time between the falling portion of the CH-1 waveform and the vertical sync signal of the CH-2 video signal is 7 H ± 1 H lines. (See Fig. 4-8.)

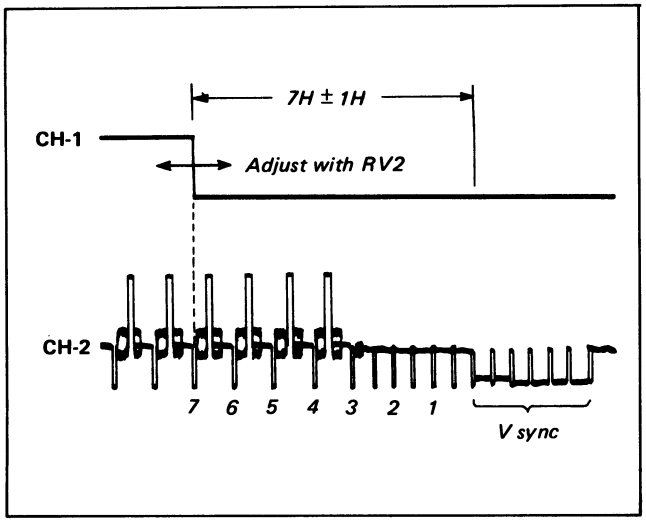


Fig. 4-8. RF switching position adjustment (1)

(6) Play back the monoscope signal segment of the alignment tape.
(7) Short the collector of Q32 on the SA-5 board and TP3 (GND) with a lead having alligator clips. (See Fig. 4-9.)

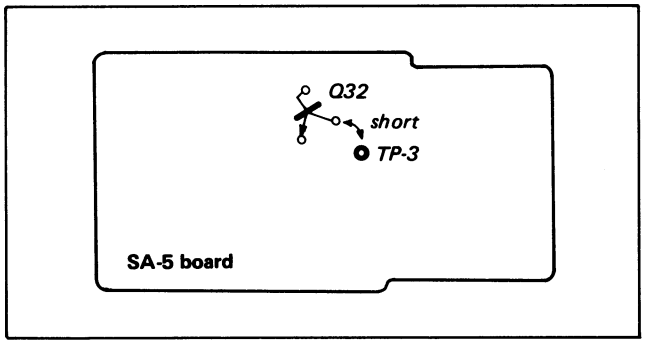


Fig. 4-9. RF switching position adjustment (2)

(8) Adjust **RV1** so that the V-jitter of the playback picture becomes minimum on the monitor TV screen.
(9) Remove the shorting lead after the adjustment and set the TRACKING CONTROL knob to the center detent position.

3. Record MODE Servo Lock Phase Adjustment (YC-4 & SA-5 boards)

(1) Supply the video signal to the machine and record it. (βII mode)
(2) Connect the oscilloscope CH-1 probe to TP001 on the SA-5 board and the CH-2 probe to TP11 on the YC-4 board.
(3) Adjust **RV3** on the **SA-5** board so that the time between the falling portion of the CH-1 waveform and the vertical sync signal of the CH-2 video signal is 7 H ± 1 H lines. (See Fig. 4-10.)

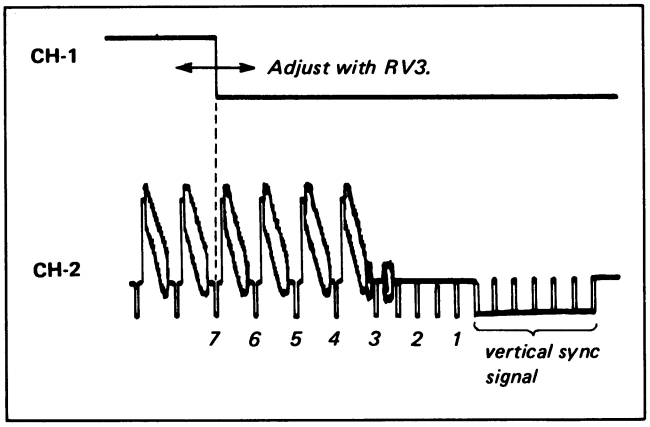


Fig. 4-10. Record-servo lock phase adjustment

4. BETA SCAN (CUE/REVIEW), Drum Free Speed Adjustment (YC-4 & SA-5 boards)

(1) Receive a telecast signal.
(2) Record the signal in the βIII mode on the center section of the L-500 cassette tape (in the state that the tape amounts on the take-up and the supply reel tables are equal).
(3) Connect the oscilloscope to TP15 on the YC-4 board.
(4) Play back the recorded portion.
(5) Position the positive-going edge of the waveform at the exact center of the oscilloscope scale. (See Fig. 4-11.)

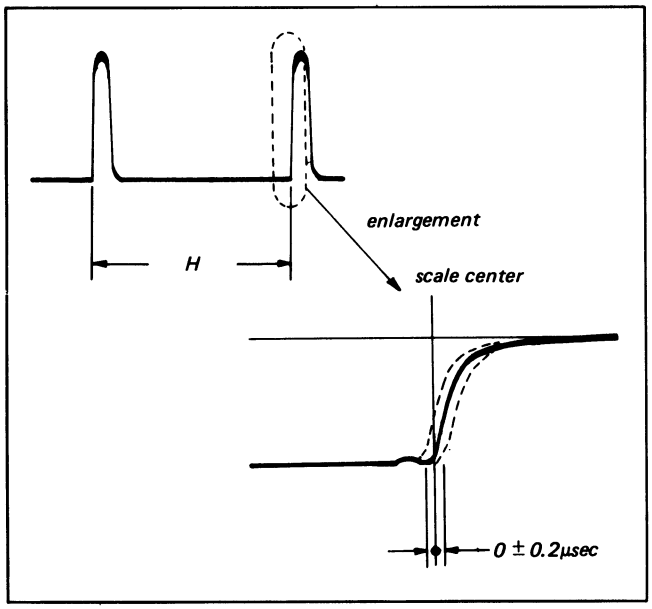


Fig. 4-11. BETA SCAN (CUE/REVIEW) free speed adjustment

(6) Depress FF (CUE) button on machine.
(7) Adjust **RV501** on the **SA-5** board so that the deviation (jitter) of the rising section from the scale center (at the center of shaking) is 0 ± 0.2 μsec. (See Fig. 4-11.)
(8) Depress REWIND (REVIEW) button on machine.
(9) Adjust **RV502** on the SA-5 board so that the deviation (jitter) of the rising section from the scale center (at the center of shaking) is 0 ± 0.2 μsec. (See Fig. 4-11.)

4-3-2. Capstan Servo System Alignment

1. Capstan Free Speed Adjustment (SA-5 board)

(1) Play back the βII mode of the alignment tape.
(2) Connect the oscilloscope CH-1 probe to pin 19 of IC2 and the CH-2 probe to pin 20 of IC2.
(3) Set the TAPE SPEED switch (S4, rear of the set) to βI.
(4) Adjust RV5 for the phase lock shown in Fig. 4-12.

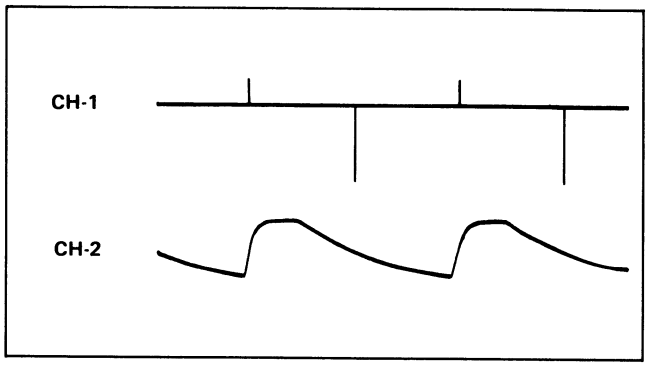


Fig. 4-12. Phase lock

(5) Connect the oscilloscope to TP5. Input: dc range
(6) Adjust RV5 for a dc level of 5.5V ± 0.3V. (See Fig. 4-13.)
(7) Set the TAPE SPEED switch to βII, βIII.
(8) Record the telecast signal in the βIII mode and adjust RV4 for 5.5 V ± 0.3 V. (See Fig. 4-13.)
(9) Record the telecast signal in the βII mode and adjust RV11 for 5.5V ± 0.3V.
(10) Play back the βII mode of the alignment tape (color-bar or monoscope) with FAST PLAY button pushed and adjust RV10 for 5.5V ± 0.3V.

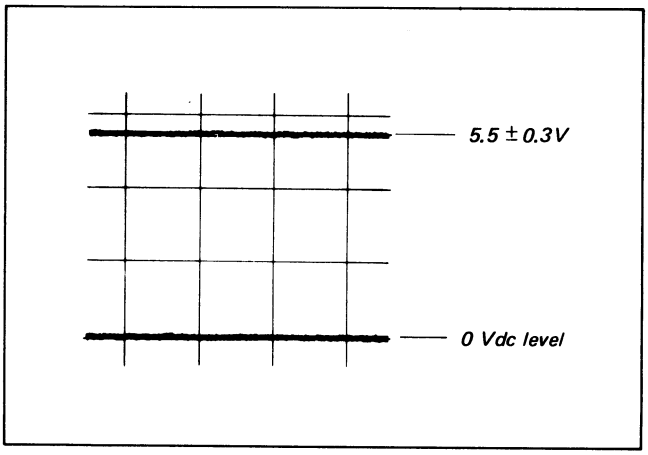


Fig. 4-13. Capstan free speed adjustment

2. Tracking Control Center Adjustment (SA-5 board)

(1) Set the TRACKING CONTROL knob to its center detent position.
(2) Play back the βII mode segment of the alignment tape.
(3) Connect the oscilloscope CH-1 probe to TP7 and the CH-2 probe to TP6.
(4) Adjust RV6 so that the phase of the CH-1 negative-going edge is the same as that of the CH-2 negative-going edge. (See Fig. 4-14.)

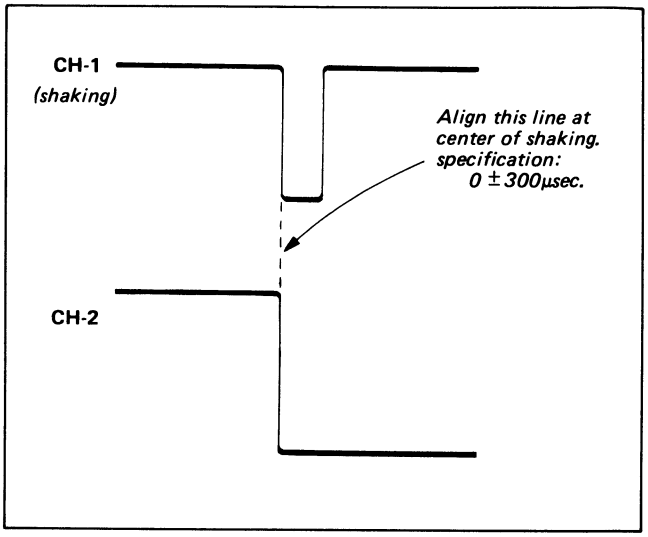


Fig. 4-14. Tracking control center adjustment

3. Tape Speed Detection Adjustment (SA-5 board)

(1) Play back the βII mode of the alignment tape.
(2) Connect the oscilloscope to the collector of Q36. Input: DC range
(3) Adjust RV7 so that the waveform peak is 7.35 V ± 0.2 V. (See Fig. 4-15.)

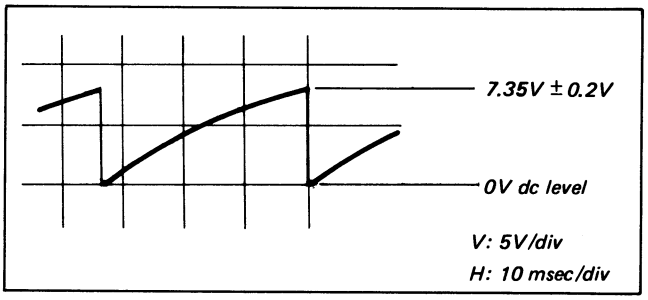


Fig. 4-15. Tape speed detection adjustment

4. Fast Play Noise Position Adjustment (SA-5 board)

(1) Record the telecast signal in the βII mode.
(2) Set the TRACKING knob to it's center detent position.
(3) Play back the recorded portion with FAST PLAY button depressed.
(4) Adjust RV9 so that noise disappears on the monitor screen. (See Fig. 4-16.)

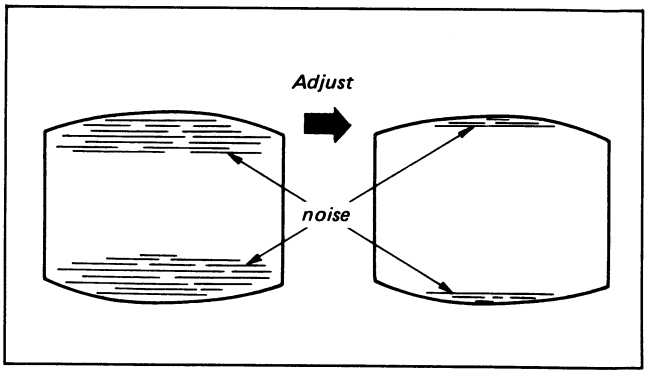


Fig. 4-16. Fast play noise position adjustment

4-3-3. 0.5H Compensation Circuitly Adjustment

1. 0.5H jumping detection VCO adjustment (CR-6 board)

(1) Play back the βII mode of the alignment tape.

(2) Connect the oscilloscope to point Ⓐ shown in Fig. 4-17. (Input; dc range)

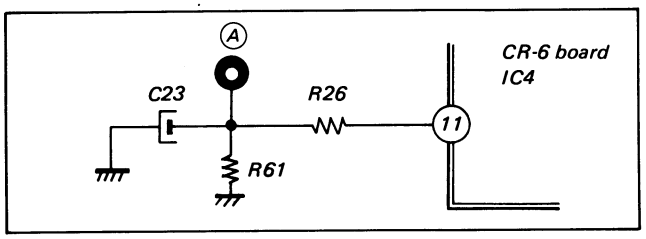


Fig. 4-17. Measurement point

(3) Adjust RV4 for 3.2V ± 0.1V

2. Bias voltage adjustment (CR-6 board)

(1) Set up the E-E mode (Insert the cassette and set up the STOP mode.), and no-signal condition at the VIDEO IN. Move " CAMERA/TUNER" selector switch to CAMERA position.

(2) Connect the oscilloscope to pin 8 of IC2. (Input range; dc)

(3) Adjust **RV2** for 7V ± 0.3V. (See Fig. 4-18.)

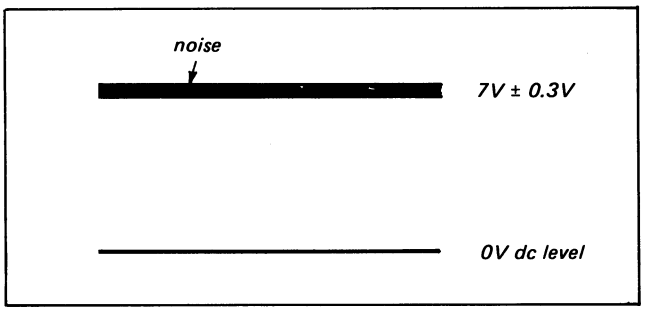


Fig. 4-18. Bias voltage adjustment

3. Carrier waveform phase adjustment

(1) Supply the color-bar signal and set up the E-E mode.

(2) Connect the oscilloscope to pin 8 of IC2.

(3) Adjust **VL1** for maximum waveform. (See Fig. 4-19.)

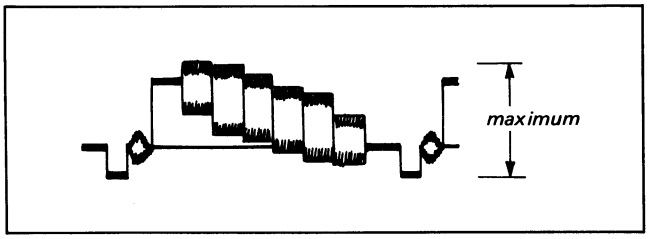


Fig. 4-19. Carrier waveform phase adjustment

4. Video Y level deviation adjustment (CR-6 board)

(1) Play back the βII mode of alignment tape with FAST PLAY button pushed.

(2) Connect the oscilloscope to pin 1 of IC5 on the CR-6 board.
TRIG; EXT . . . . . TP-3 on the RP-1 board

(3) Adjust **RV1** so that the level deviation between A-CH and B-CH is the minimum.

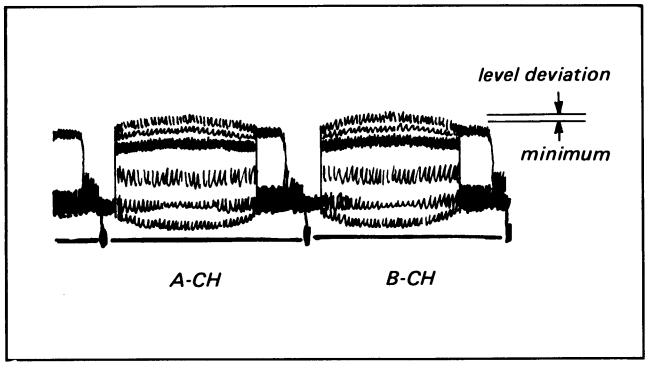


Fig. 4-20. Video Y level deviation adjustment

(4) Make sure that flicker is the minimum on the monitor screen.
(Note; Color level of monitor television should be minimum.)

5. Video chroma level deviation adjustment (CR-6 and RP-1 boards)

(1) Play back the color-bar signal segment of βII mode of alignment tape with FAST PLAY button pushed.

(2) Connect the oscilloscope to pin 1 of IC5 on the CR-6 board.
TRIG: EXT . . . . TP-3 on the RP-1 board

(3) Minimise level deviation between Ach and Bch with **RV3** on the CR-6 board. (See Fig. 4-21.)

(4) Make sure that flicker is the minimum on the monitor screen.

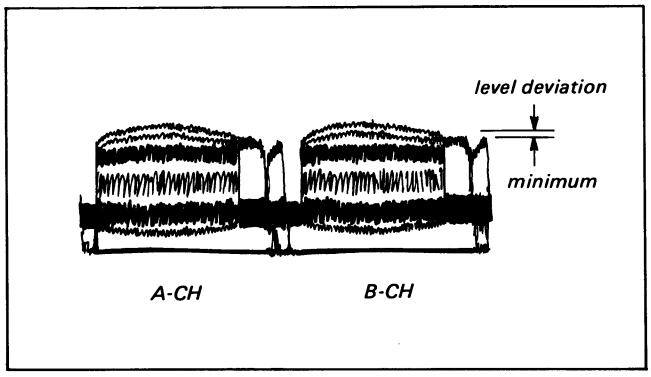


Fig. 4-21. Video chroma level deviation adjustment

4-4. VIDEO SYSTEM ALIGNMENT (RP-1 & YC-4 boards)

The playback system is aligned first with the alignment tape, and the record system is aligned after the playback system is confirmed to operate properly.

The alignment sequence is shown below. The Y-signal and chroma signal systems are aligned for each of the playback and the record systems.

The color video signal supplied from the tuner-I.F. block, is utilized as the video input signal for the video system alignment in the RECORD mode. It is important to check that the sync and color burst signals satisfy the required specification shown in Fig. 4-1. (Preparatory set-up for alignment.)

[Playback System Alignment]

1. Playback Amplifier Frequency Response Adjustment
2. Dropout Compensator threshold Adjustment
3. Playback Video Output Level Adjustment
4. Noise canceller II Adjustment
5. 3.58 MHz Oscillator Frequency Adjustment
6. VCO Free Frequency Adjustment and VCO Lock Check

[Record System Alignment]

7. E-E Video Output Level (Peak AGC) Adjustment
8. AGC Adjustment
9. Comb Filter Adjustment and Color Video Level Adjustment
10. Sync Tip Carrier Frequency Set and FM Modulator Deviation Adjustment
11. ACC Adjustment
12. 4.27 MHz Carrier Leak Adjustment
13. White Clip Adjustment
14. Dark Clip Adjustment
15. Hard Clamp Adjustment
16. Y-FMRecord Current Adjustment
17. Chroma Record Current Adjustment

[Setting for Alignment]

- Connect a color television receiver to the VHF OUT terminal.
- Set the TRACKING CONTROL knob to the center detent position unless otherwise instructed.

1. Playback Amplifier Frequency Characteristic Adjustment (RP-1 board)

The CH-A and CH-B amplifiers require independent frequency characteristic adjustments. The adjustment for the CH-B is indicated in parentheses.

(1) Play back the Beta II RF sweep signal segment of the alignment tape.
(2) Connect the oscilloscope to TP4 and trigger it externally from TP3. Select the negative (–) trigger slope to observe the CH-A signal and the positive (+) one to observe the CH-B signal.
(3) Turn the TRACKING CONTROL knob for maximum RF output level.
(4) Adjust **RV6** (RV5) so that the level between 2 MHz and 5.1 MHz is flat. (See Fig. 4-22.)
(5) Adjust **RV7** so that the CH-A and the CH-B levels from 2 MHz to 4.5 MHz are equal. (See Fig. 4-22.)

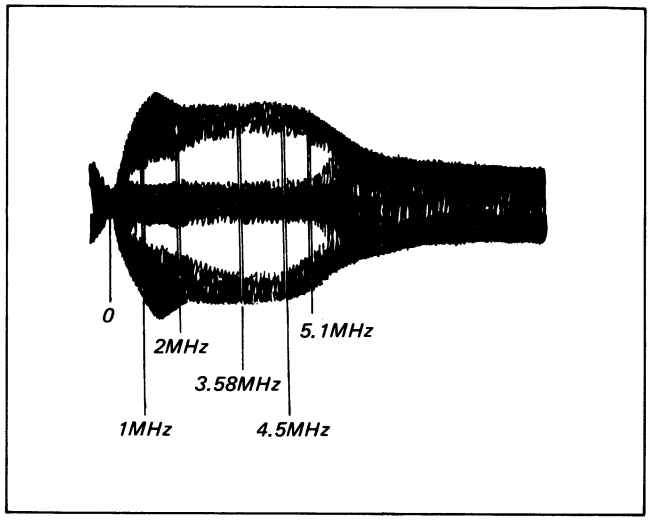


Fig. 4-22. Playback amplifier frequency characteristic adjustment

2. Dropout Compensator Sensitivity Adjustment (RP-1 board)

(1) Play back a prerecorded tape known to have many dropouts.
(2) Turn **RV8** fully clockwise as viewed from the conductor side.
(3) Turn RV8 counterclockwise slowly until the dropouts disappear and set **RV8** to that point.
(4) Rewind the tape and play it back. Check that the dropouts are compensated for at the places where the dropouts were observed in Step (2).

3. Playback Video Output Level Adjustment (YC-4 board)

(1) Play back the color bar signal segment of the alignment tape.
(2) Set the TRACKING CONTROL knob to the point where the best tracking is obtained.
(3) Connect the oscilloscope to TP13.
(4) Adjust RV5 for 1.15 Vp-p. (See Fig. 4-23.)

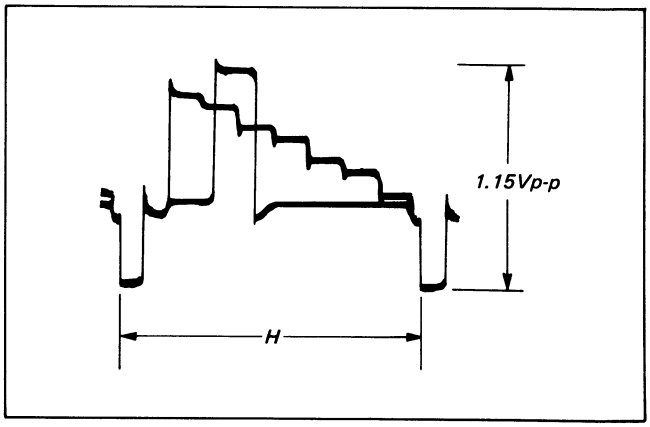


Fig. 4-23. Playback video output level adjustment

4. **Noise Canceller II Adjustment (YC-4 board)**
   (1) Playback the color bar signal segment of the alignment tape Beta II mode.
   (2) Connect the oscilloscope to TP12.
   (3) Adjust **RV2** for minimum output. (See Fig. 4-24.)

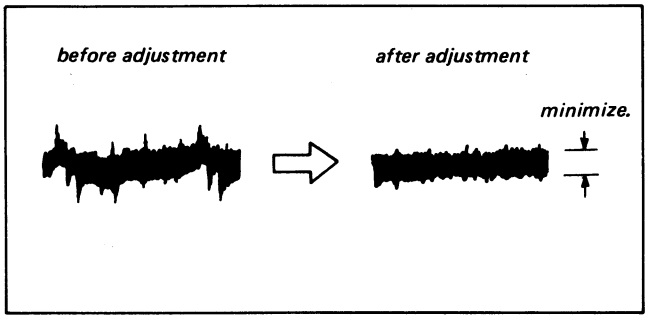


Fig. 4-24. Noise canceller II adjustment

5. **3.58 MHz Oscillator Frequency Adjustment (YC-4 board)**
   (1) Play back a blank tape.
   (2) Connect the frequency counter to TP8.
   (3) Adjust T5 for a counter reading of 3,579,545 ± 5 Hz. (See Fig. 4-25.)

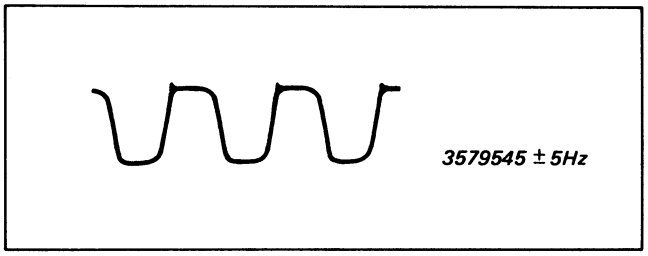


Fig. 4-25. 3.58 MHz oscillator output

6. **VCO Free Frequency Adjustment and VCO Lock Check (YC-(YC-4 board)**
   (1) Impress a 8.5 V ± 0.1 V level to TP9 from the DC-regulated power supply.
   (2) Insert a blank tape and set up the PLAY mode.
   (3) Connect the frequency counter to TP10. (See Fig. 4-26.)

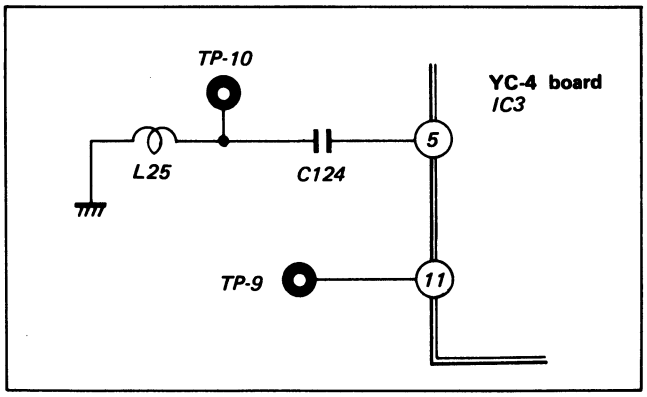


Fig. 4-26. Measurement points

   (4) Adjust **RV9** for a counter reading of 688,373 ± 1500 Hz.
   (5) Remove the DC-regulated power supply connected in Step (1). Supply the color bar signal to the machine and set up the RECORD mode.
   (6) Connect the oscilloscope to pin 20 of IC3 and check that the waveform shown in Fig. 4-27 is obtained.

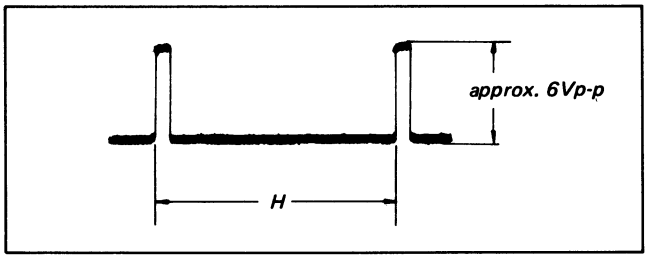


Fig. 4-27. Sync signal

   (7) Check that the frequency at TP10 is 688,373 Hz.
   (8) Connect the oscilloscope CH-1 probe to pin 20 of IC3 and the CH-2 probe to pin 23 of IC3. Check that the CH-1 and the CH-2 waveforms are as shown in Fig. 4-28.

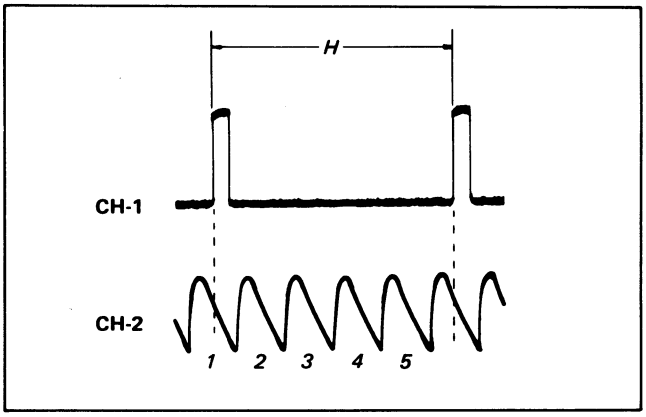


Fig. 4-28. VCO lock check

7. **E-E Video Output Level (Peak AGC) Adjustment (YC-4 board)**
   (1) Supply the color bar signal and set up the RECORD mode.
   (2) Connect the oscilloscope to pin 24 of IC1.
   (3) Adjust **RV18** for maximum level.
   (4) Adjust **RV16** for 1.1 Vp-p. (See Fig. 4-29.)

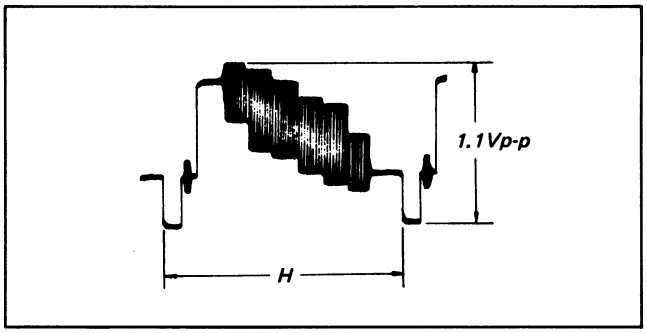


Fig. 4-29. E-E video output level (peak AGC) adjustment

   (5) Adjust **RV18** for 1.06 ± 0.1 Vp-p. (See Fig. 4-31.)

8. AGC Adjustment (YC-4 board)

(1) Supply the color bar signal and set up the RECORD mode.
(2) Connect the oscilloscope CH-1 probe to pin 3 of IC1 and the CH-2 probe to pin 4 of IC1.
(3) Check that the CH-1 and the CH-2 waveforms are as shown in Fig. 4-30.

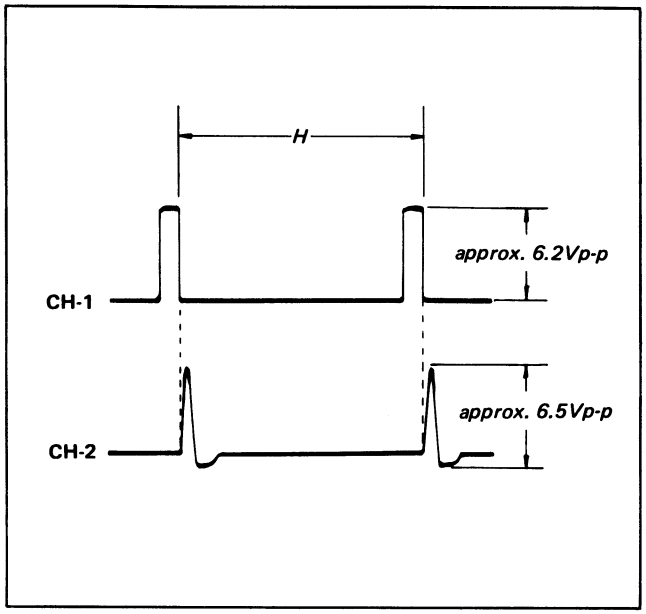


Fig. 4-30. AGC check

(4) Connect the oscilloscope to pin 24 of IC1.
(5) Adjust RV18 for 1.06 ± 0.1 Vp-p. (See Fig. 4-31.)

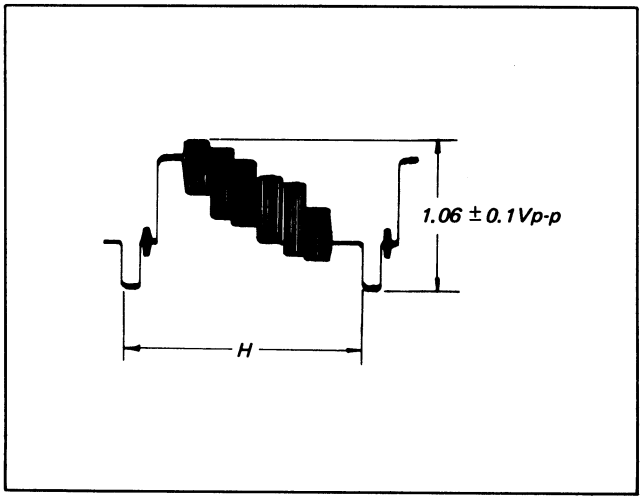


Fig. 4-31. AGC adjustment

9. Comb Filter Adjustment and Color Video Level Adjustment (YC-4 board)

(1) Supply the color bar signal and set up the RECORD mode.
(2) Connect the oscilloscope to TP4.
(3) Turn L12 and RV4 alternately to make the chroma signal minimum. (See Fig. 4-32.)

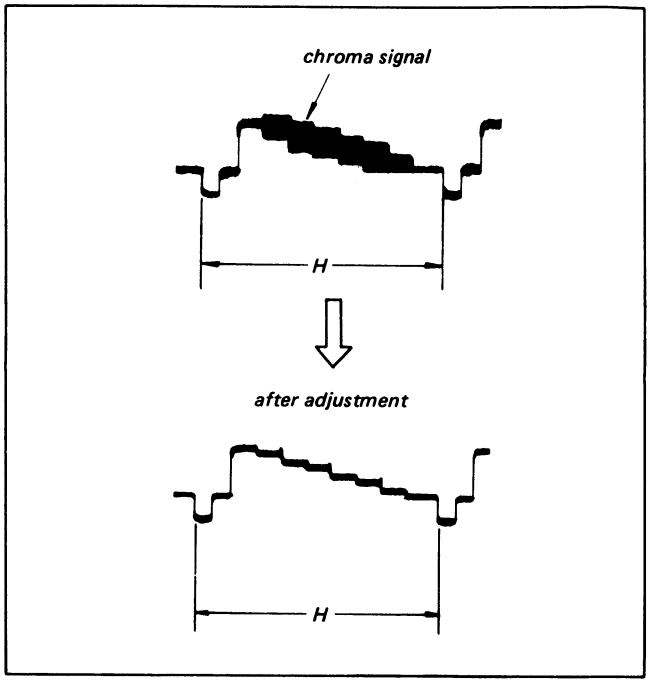


Fig. 4-32. Comb filter adjustment

(4) Connect the oscilloscope CH-1 probe to TP3 and the CH-2 probe to pin 22 of IC1.
(5) Adjust RV3 so that the CH-1 and the CH-2 waveform levels become equal. (See Fig. 4-33.)

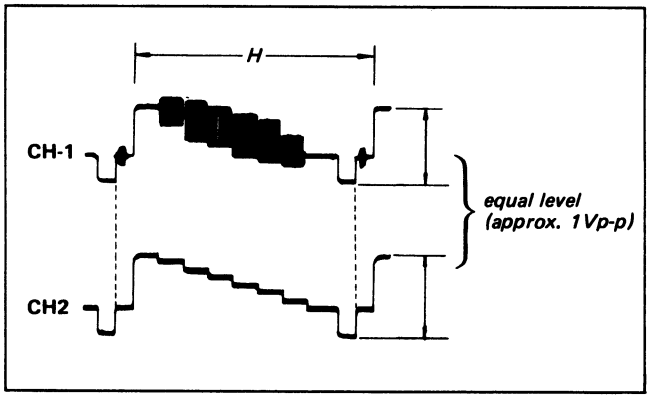


Fig. 4-33. Color video level adjustment

10. SYNC Tip Carrier Frequency Set and FM Modulator Deviation Adjustment (YC-4 board)

[Note prior to the adjustment]

Perform this adjustment after confirming that the Playback Video Output Level Adjustment, Adjustment 3, was completed. The following adjustments A and B should be performed alternately in this adjustment.

A
(1) Set up no signal state at the VIDEO IN terminal and set up the βII RECORD mode.
(2) Inpress a 6.0 V to pin 3 of IC1 from the DC regulated power supply.
(3) Connect the frequency counter to TP7.
(4) Adjust RV15 for a counter reading of 3.6 ± 0.04 MHz.

B
(5) Supply the color bar signal and set up the βII RECORD mode.
(6) Play back the recorded segment.
(7) Connect the oscilloscope to TP13.
(8) Adjust the deviation with **RV14** so that the waveform is 1.15 Vp-p. (See Fig. 4-34.)

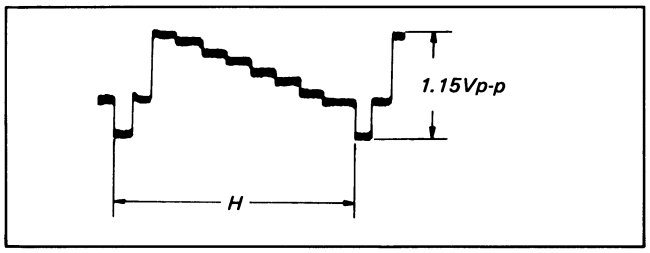


Fig. 4-34. Sync tip carrier set and FM modulator deviation adjustment

(9) Repeat Adjustments A and B alternately until A and B are completed.

11. ACC Adjustment (YC-4 board)
(1) Supply the color bar signal and set up the RECORD mode.
(2) Connect the oscilloscope to pin 11 of IC2.
(3) Adjust **RV7** for 0.85 Vp-p. (See Fig. 4-35.)

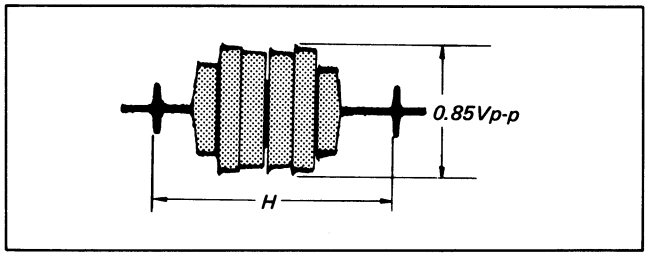


Fig. 4-35. ACC adjustment

12. 4.27 MHz Carrier Leak Adjustment (YC-4 board)
(1) Supply the color bar signal and set up the RECORD mode.
(2) Connect the oscilloscope to pin 24 of IC2.
(3) Adjust **RV8** for minimum 4.27 MHz carrier component. (See Fig. 4-36.)

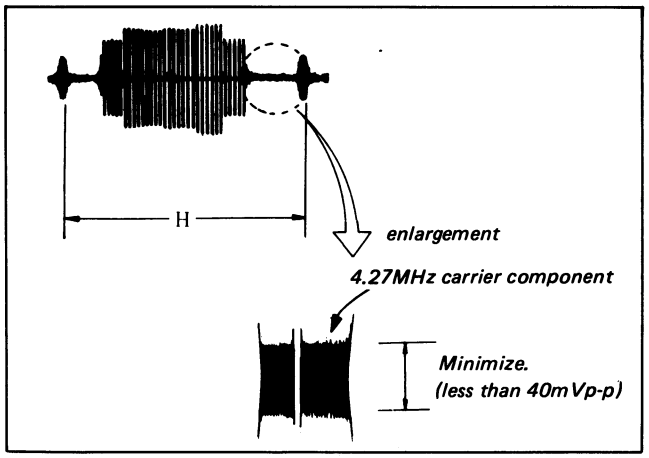


Fig. 4-36. 4.27 MHz carrier leak adjustment

13. White Clip Adjustment (YC-4 board)
(1) Supply the color bar signal and set up the RECORD mode.
(2) Connect the VOM across R156.
(3) Adjust **RV12** for 0.3 V.

14. Dark Clip Adjustment (YC-4 board)
(1) Supply the color bar signal and set up the RECORD mode.
(2) Connect the oscilloscope CH-1 probe to the Q13 collector and the CH-2 probe to TP5. Set the scope to the DC range and arrange its zero levels.
(3) Adjust **RV11** so that the difference between the CH-1 level and the CH-2 sync tip is 120 mV. (See Fig. 4-37.)

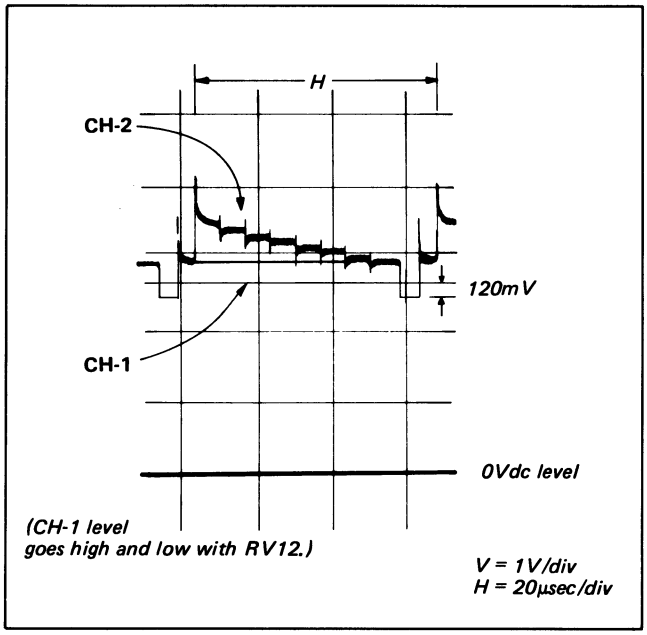


Fig. 4-37. Dark clip adjustment

15. Hard Clamp Adjustment (YC-4 board)
(1) Supply the color bar signal and set up the RECORD mode.
(2) Insert a capacitor of 47 μF/16V between the Q4 base and earth. (Q4 collector)
(3) Connect the oscilloscope to TP6 shown in Fig. 4-38.

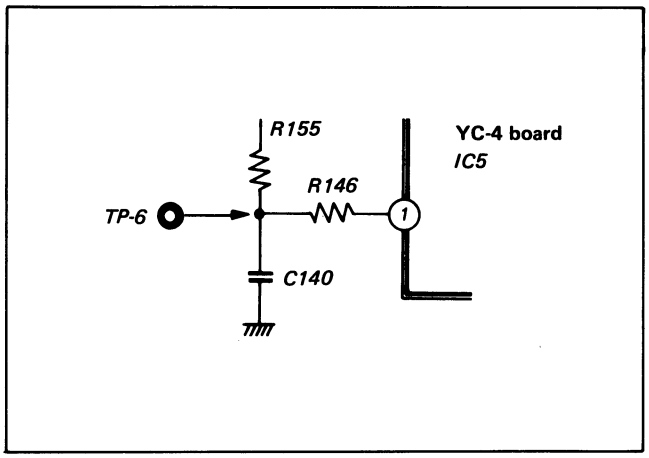


Fig. 4-38. Measurement point

(4) Adjust RV10 to eliminate the level difference at every 1H. (See Fig. 4-39.)
Specification: less than 3 mV

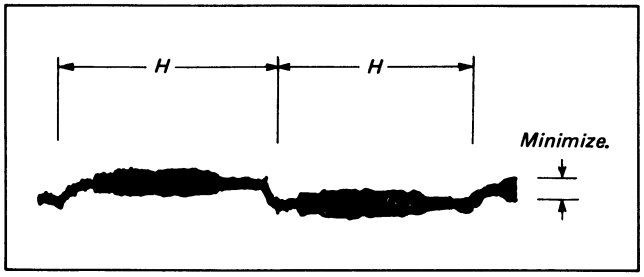


Fig. 4-39. Hard clamp adjustment

16. Y-FM Record Current Adjustment (RP-1 board)

(1) Set up the no-signal condition at the VIDEO IN. Move "Camera/Tuner" switch to "Camera" position.
(2) Set up the RECORD mode.
(3) Connect CH-1 of scope to TP1 and CH-2 to TP2.

Note: Connect the ground lead of the oscilloscope for CH-1 only to VTR ground, such as TP7. Do not ground other probe ground lead, 0.2 μsec/cm sweep, vert. at 0.05 V/cm, add CH-1 and 2.

(4) Adjust RV1 for 125 ± 10 mVp-p. (See Fig. 4-40.)

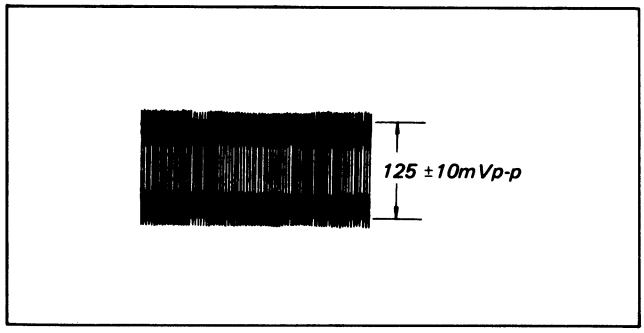


Fig. 4-40. FM record current adjustment

17. Chroma Record Current Adjustment (YC-4 board)

(1) Supply the color bar signal and set up the STOP mode.
(2) Connect the oscilloscope to the mid point of RV1.
(3) Adjust RV1 for 380 ± 10 mVp-p. (See Fig. 4-41.)

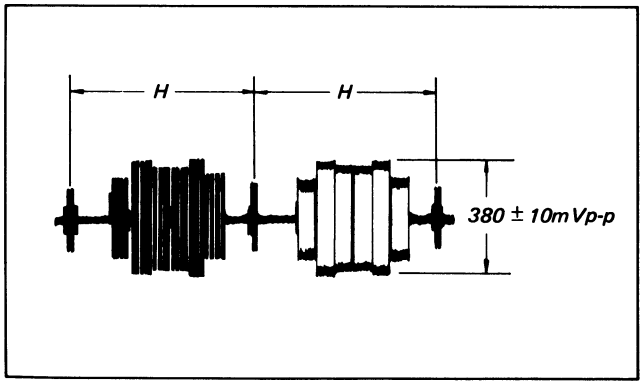


Fig. 4-41. Chroma record current adjustment

4-5. AUDIO SYSTEM ALIGNMENT

[Connection of Relative Equipment]

The connection of the equipment is shown in Fig. 4-42.

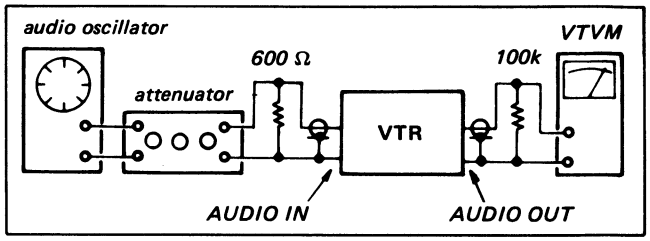


Fig. 4-42. Connection of audio test equipment

[Adjustment Mode]

All the adjustments of the audio system should be done in the βIII mode. (It is not necessary to do them in the βII mode.)

[Adjustment Sequence]

1. Azimuth Adjustment
2. Playback Frequency Characteristic Adjustment
3. Playback Output Level Adjustment
4. Bias Oscillator Check
5. Bias Trap Adjustment
6. Record Bias Adjustment
7. Audio Dubbing Adjustment and Check
8. Record Current Adjustment
9. Overall Frequency Characteristic Check
10. AGC Operation Check
11. Overall S/N Ratio Check
12. Overall Distortion Check

1. Azimuth Adjustment

(1) Terminate the AUDIO OUT terminal with a 100 kΩ resistor and connect the VTVM.
(2) Play back the 5 kHz audio signal segment of the alignment tape.
(3) Adjust the azimuth adjusting screw on the audio head for maximum output level. (See Fig. 4-43.)

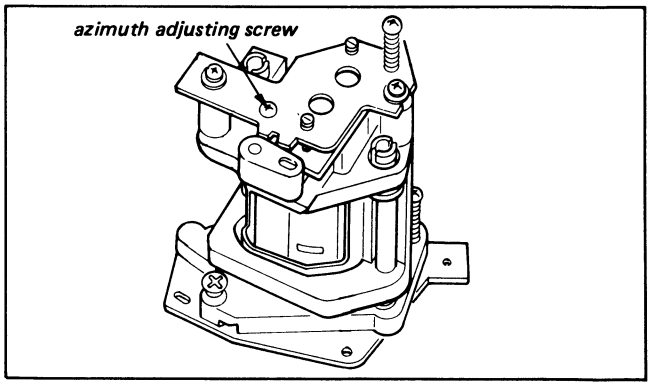


Fig. 4-43. Azimuth adjustment

2. **Playback Frequency Characteristic Adjustment (SA-5 board)**
   (1) Terminate the AUDIO OUT terminal with a 100 kΩ resistor and connect the VTVM.
   (2) Play back the 333 Hz segment of the alignment tape. Measure the output level and write it down.
   (3) Then play back the 5 kHz segment of the alignment tape.
   (4) Adjust RV61 so that the playback output level of the 5 kHz signal is -20^{+1}_{-0} dB in reference to the measured level of 333 Hz output level.
   Example: If the 333 Hz output level is −5 dB, the 5 kHz output level should be adjusted to −25 dB.

   Note: The level of the 5 kHz audio signal recorded on the alignment tape is −25 dB.

3. **Playback Output Level Adjustment (SA-5 board)**
   (1) Terminate the AUDIO OUT terminal with a 100 kΩ resistor and connect the VTVM.
   (2) Play back the 333 Hz audio signal segment of the alignment tape.
   (3) Adjust RV63 for a playback output level of −5 ± 1 dB.

4. **Bias Oscillator Check (SA-5 board)**
   (1) Set the input signal level to zero. (Set the audio oscillator output to zero and the attenuator to maximum.
   (2) Insert the cassette and set up the RECORD mode.
   (3) Connect a microinductor of approx. 33 mH to the frequency counter and move the counter to T61 (oscillating transformer in the shield case). (See Fig. 4-44.)
   (4) Check that the oscillating frequency is 65 kHz ± 6.5 kHz.

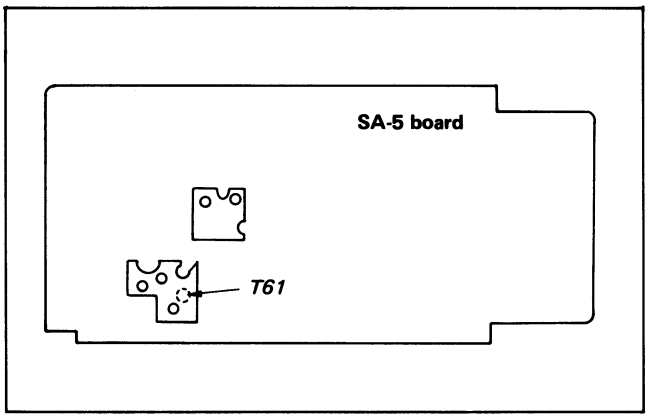


Fig. 4-44. Bias oscillator check

5. **Bias Trap Adjustment (SA-5 board)**
   (1) Set the input signal level to zero. (Set the audio oscillator output to zero and the attenuator to maximum.
   (2) Insert the cassette and set up the RECORD mode.
   (3) Connect the oscilloscope to TP64.
   (4) Adjust LV62 for minimum bias leak.
   Value: minimum level below 1 Vp-p

6. **Record Bias Adjustment (SA-5 board)**
   Check that the playback frequency characteristic adjustment has been completed.
   (1) Connect TP61 and TP62 (GND) with a jumper so as to turn off the AGC operation.
   (2) Connect the 333 Hz audio signal to the ADUIO IN.
   (3) Terminate the AUDIO OUT terminal with a 100 kΩ resistor and connect the VTVM.
   (4) Set up the E-E mode. (Insert the cassette and set up the STOP mode.)
   (5) Adjust the AUDIO OUT terminal level with the attenuator for −25 dB.
   (6) Depress the RECORD button and make a recording for about five digits on the tape counter.
   (7) Change the audio signal to 5 kHz at −25 dB and make a recording for about five digits on the tape counter.
   (8) Play back the tape recorded in Steps (6) and (7). Measure the playback output levels of the 333 Hz and 5 kHz.
   (9) Check that the playback output level of the 5 kHz is $0^{+0.5}_{-0}$ dB in reference to the 333 Hz playback output level. If not, adjust the bias current with RV65 and repeat Steps (2) to (9) until the specification is satisfied.
   (10) Remove the jumper connected to TP61 after the adjustment.

7. **Audio Dubbing Adjustment and Check**

[Adjustment]

   (1) Set up the AUDIO DUB mode.
   (2) Perform Steps (1) to (10) of Adjustment 6, Record Bias Adjustment and obtain the specified levels of the 333 Hz and the 5 kHz signals.
   If the specification is not satisfied, adjust LV61 (DUB BIAS) to obtain specification.

[Check]

   (1) Set up the AUDIO DUB mode.
   (2) Perform Adjustment 9 "Overall Frequency Characteristic Adjustment" and confirm that the specification is satisfied.
   (3) Remove the jumper connected to TP61 after the adjustment.

8. **Record Current Adjustment**
   (1) Connect TP61 and TP62 (GND) with a jumper so as to turn off the AGC operation.
   (2) Supply the 333 Hz signal to the AUDIO IN terminal.
   (3) Terminate the AUDIO OUT terminal with a 100 kΩ resistor and connect the VTVM.
   (4) Set up the E-E mode. (Insert the cassette and set up the STOP mode.)
   (5) Adjust the attenuator for an output level of −5 dB.
   (6) Make a recording in this state for about five digits on the tape counter.
   (7) Play back the tape segment recorded in Step (6) and check that the playback output level is −5 dB to −6 dB. If not, adjust the record current with RV62 and repeat Steps (2) to (7).
   (8) Remove the jumper between TP61 and GND.

9. Overall Frequency Characteristic Check (SA-5 board)

(1) Connect TP61 and TP62 (GND) with a jumper so as to turn off the AGC operation.
(2) Terminate the AUDIO OUT terminal with a 100 kΩ resistor and connect the VTVM.
(3) Connect the 333 Hz signal to the AUDIO IN terminal.
(4) Set up the E-E mode. (Insert the cassette and set up the STOP mode.
(5) Adjust the audio line output level to −25 dB by the attenuator.
(6) Press the RECORD button and make a recording for about five digits on the tape counter.
(7) Repeat Steps (5) and (6) by switching the oscillator to 50 Hz, 100 Hz, 333 Hz, 3 kHz, 5 kHz and 7 kHz.
(8) Play back the recorded portions and confirm that the output levels satisfy the specified values below.

Values: With reference to the 333 Hz playback output level.

50 Hz $^{+2.5}_{-13}$ dB

100 Hz $^{+2}_{-5}$ dB

3 kHz ±2.5 dB

5 kHz ±2.5 dB

7 kHz $^{+3}_{-15}$ dB

(9) If not, readjust Adjustment 2 "Playback Frequency Characteristic Adjustment" and Adjustment 6 "Record Bias Adjustment".
(10) Remove the jumper between TP61 and GND.

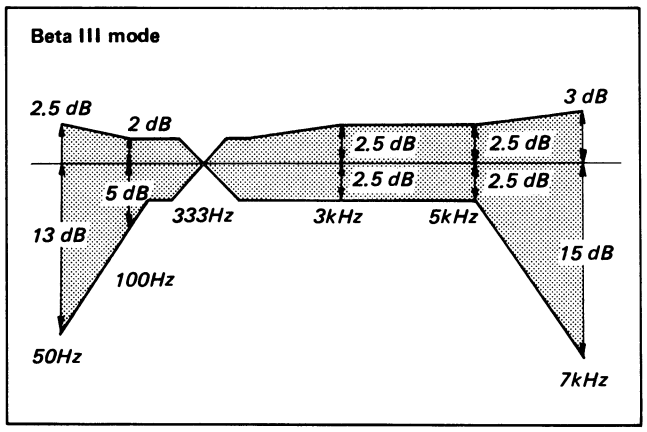


Fig. 4-45. Overall audio frequency characteristic adjustment

10. AGC Output Check

(1) Terminate the AUDIO OUT terminal with a 100 kΩ resistor and connect the VTVM.
(2) Supply the 333 Hz at −10 dB signal to the AUDIO IN terminal.
(3) Set up the E-E mode. (Insert the cassette and set up the STOP mode.)
(4) Check that the output level is −5 dB ± 2 dB.

11. Overall S/N Ratio Check

(1) Terminate the AUDIO OUT terminal with a 100 kΩ resistor and connect the VTVM.
(2) Set the input signal level to zero (set the audio oscillator output to zero and the attenuator to maximum.)
(3) Insert the cassette and make a recording of about 10 digits on the tape counter.
(4) Play back the recorded tape segment.
(5) Check that the playback output level is less than −45 dB.

Note: The specified output level at the AUDIO OUT terminal is −5 dB.

12. Overall Distortion Check

(1) Supply a 400 Hz signal at −10 dB to the AUDIO IN terminal.
(2) Make a recording about 10 digits on the tape counter.
(3) Connect the distortion meter to the AUDIO OUT terminal.
(4) Check that the distortion is less than 4% when the tape segment recorded in Step (2) is played back.

4-6. TUNER BLOCK SYSTEM ADJUSTMENT

1. DC-DC Converter Adjustment (IF-11 board)

(1) Set the CAMERA/TUNER selector switch to TUNER.
(2) Adjust RV7001 so that cathode voltage of D7002 is 112V ± 2 V.

2. Tuner AGC Adjustment (TU-9 board)

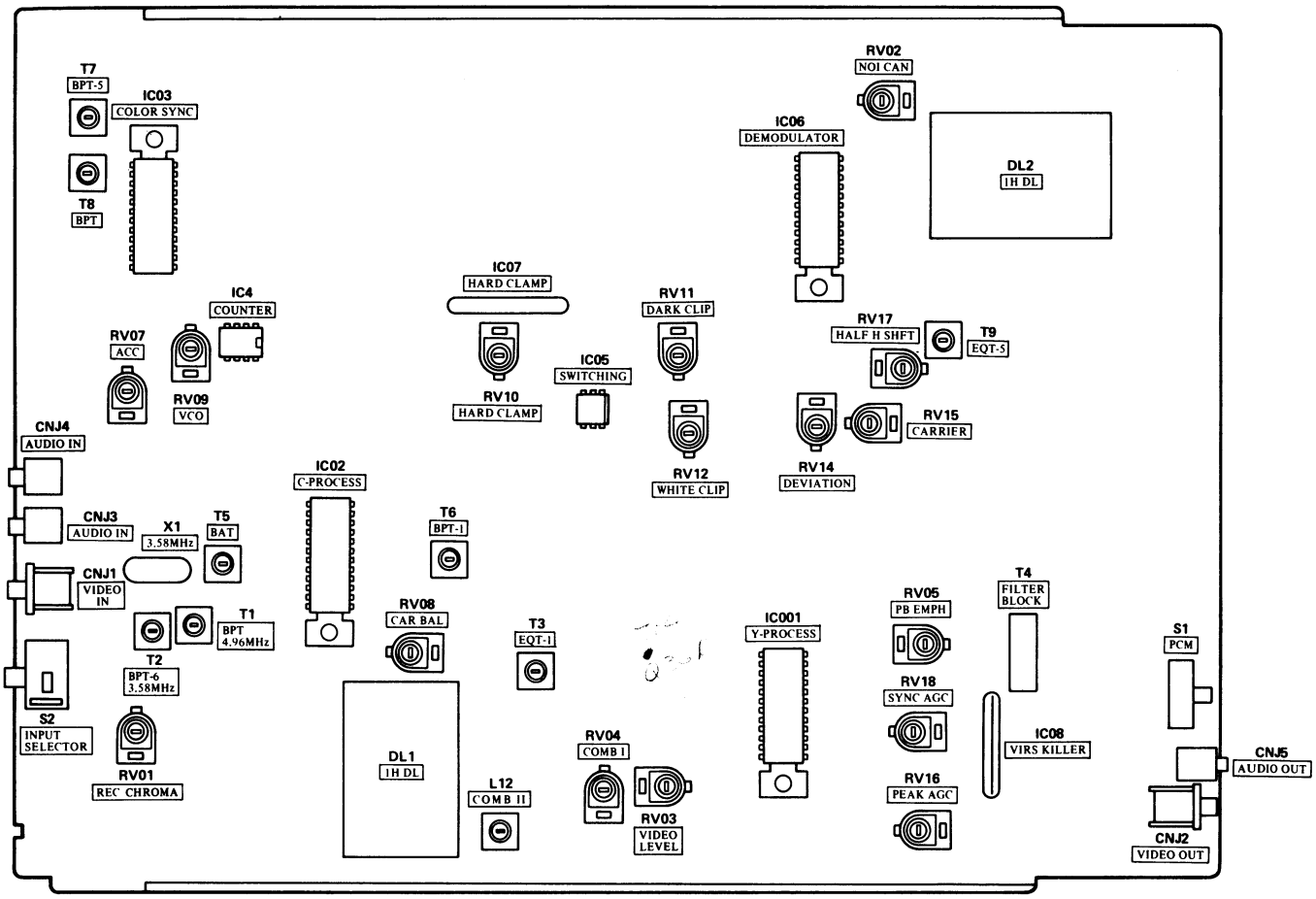
Note: The adjustment for UHF is indicated in parentheses.

(1) Receive a telecast signal with the highest contrast.
(2) Turn RV101 (RV102) so that snow noise appears on the monitor TV screen.
(3) Turn RV101 (RV102) slowly in the opposite direction and set it to the point where the snow noise disappears.
(4) Receive each channel and confirm that there are no intermodulation beat, picture distortion, nor snow noise.

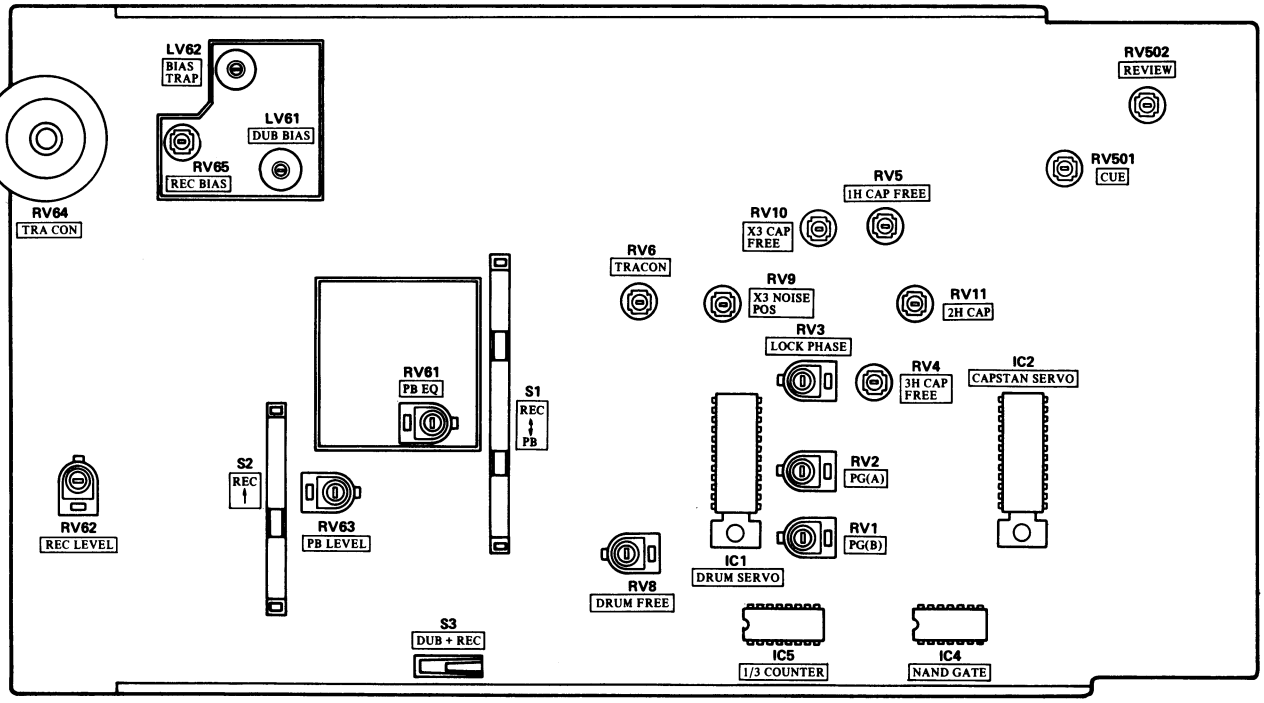
3. AFT Adjustment (IF-11 board)

(1) Receive a telecast signal.
(2) Turn off the AFT switch.
(3) Turn the PRESET VR so that a 920 kHz beat appears and then turn it in the opposite direction. Set the VR to the point where the 920 kHz beat disappears.
(4) If the 920 kHz beat appeas or color vanishes, adjust T052.

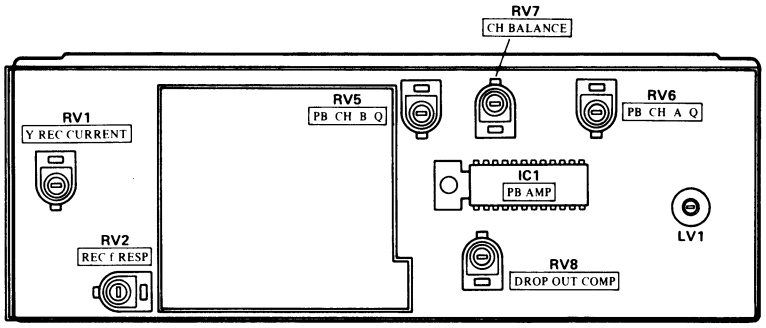
YC-4 BOARD LOCATION



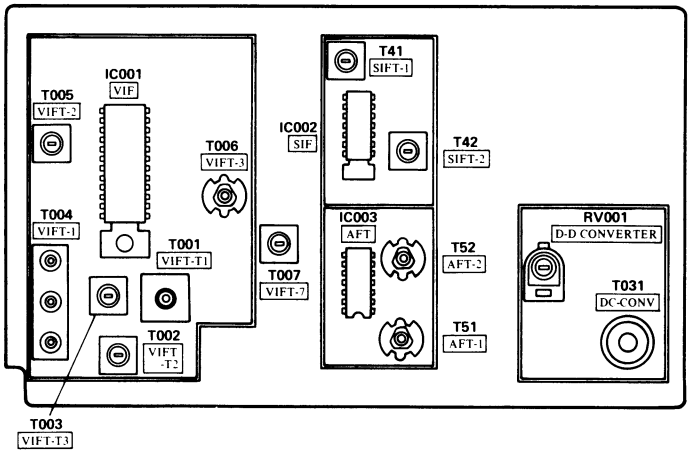
SA-5 BOARD LOCATION



RP-1 BOARD LOCATION



IF-11 BOARD LOCATION



Sony Corporation

© 1980

9-972-049-11

80A0947-1
Printed in Japan

Betamax
VIDEOCASSETTE RECORDER

SL-5600

No.1
March, 1980

SUPPLEMENT

Subject: Timer Circuit description

File this supplement with the service manual.

SONY®
SERVICE MANUAL

1. GENERAL

The specification of this timer is a 2 week 4 events and an optional channel can be programmed at an optional time in the coming two weeks. The channel selection system of the tuner block has been changed with the employment of this timer to an electronic lock system from the mechanical lock system.

2. CIRCUIT DESCRIPTION OF TIMER SECTION

(1) Required Power Supply

- EVER 12 V ..... for C-Mos, etc.
- +5 V ..... for micro computer, etc.
- +30 V ..... for driving display tubes
- AC REF ..... for reference
- AC 2.5 V ..... for filament

(2) Matrix

Matrices are formed among some of the outputs of the timer IC, MB8841-180J and among these outputs and some of the inputs. The matrix relationship is indispensable for understanding the mechanism in order to handle all the oeprations of the timer.

- **Seg 1** ((13) pin) to Seg 8 ((20) pin)
  These are the output terminals for display and form the matrix as the segment outputs.
- **G1** ((22) pin) to G6 ((27) pin)
  These are the output terminals for display and key scanning and form the matrices with the segment outputs and with the key inputs.
- **Key 1** ((30) pin) to Key 4 ((33) pin)
  These are the key input terminals and form the matrix with G1 to G6.

		22p	23p	24p	25p	26p	27p
		G1	**G2**	**G3**	**G4**	**G5**	**G6**
13p	**SEG-1**	SUN	MON	TUE	WED	THU	FRI
14p	**SEG-2**		a		a	a	SAT
15p	**SEG-3**	b	b	upper colon	b	b	ERROR
16p	**SEG-4**	c	c	lower colon	c	c	2ND WEEK
17p	**SEG-5**		d		d	d	E_1
18p	**SEG-6**		e	ON-T	e	e	E_2
19p	**SEG-7**	AM	f	OFF-T	f	f	E_3
20p	**SEG-8**	PM	g		g	g	E_4

Fig. 1-1. Matrix of G outputs and segment outputs

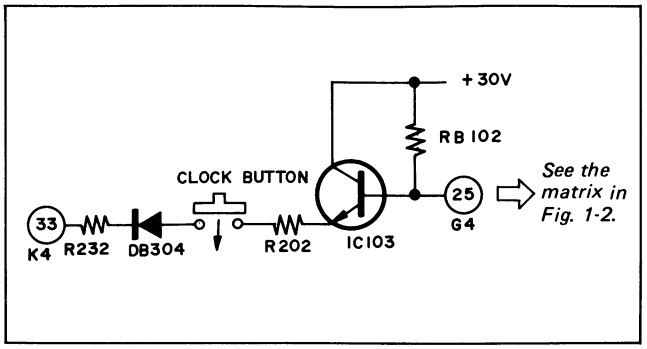
		22p	23p	24p	25p	26p	27p
		G1	**G2**	**G3**	**G4**	**G5**	**G6**
30p	**KEY-1**	SUN	THU	E_1	MIN	ON-T	12/24
31p	**KEY-2**	MON	FRI	E_2	10 MIN	OFF-T	50/60
32p	**KEY-3**	TUE	SAT	E_3	HR	END	
33p	**KEY-4**	WED	CLEAR	E_4	CLOCK	2ND WEEK	DM

Fig. 1-2. Matrix of G outputs and key inputs

(3) Circuit Description (Assume that the AC has been turned on.)

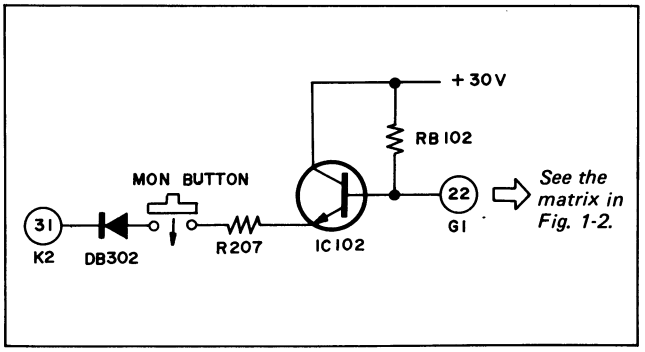
1 Current time setting

i) **Press the CLOCK SET button.**

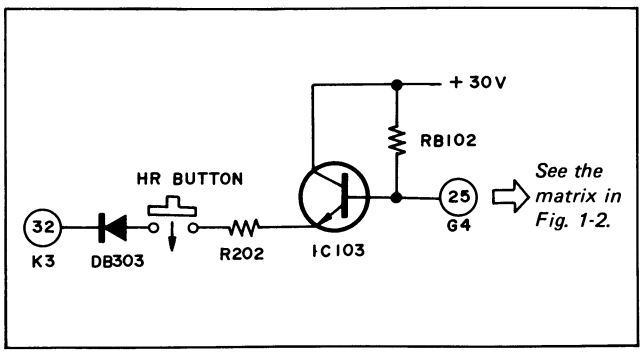


When the CLOCK SET button is pressed, the "H" signal is inputted to the (33) pin and the current time correction mode is set up for accepting the correction information.

ii) **Press DAY button.** (Example: MONday)

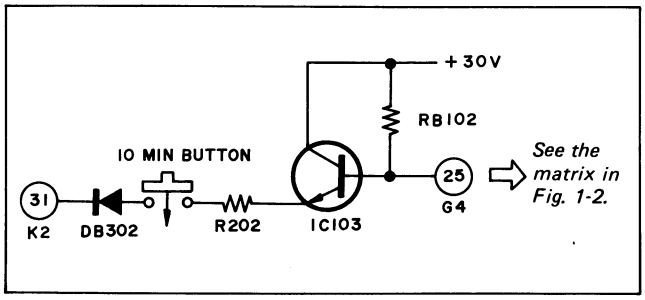


iii) **Press the HR button.**



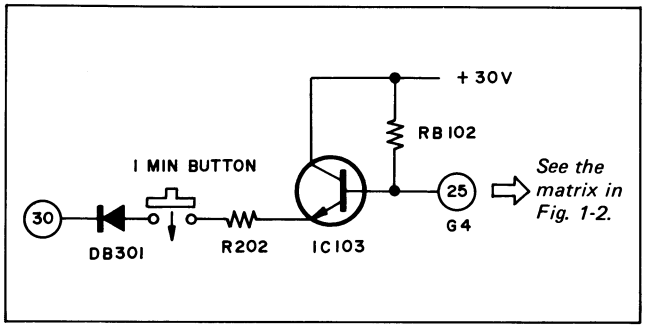
When HR button is pressed, the "H" signal is inputted to (32) pin and the hour segment block is ready for accepting an hour setting.

iv) Press the [10 MIN] button.



When the [10 MIN] button is pressed, the "H" signal is inputted to the (31) pin and the 10 minute segment block is placed into the mode ready for a 10 minute setting.

v) Press the [1 MIN] button.



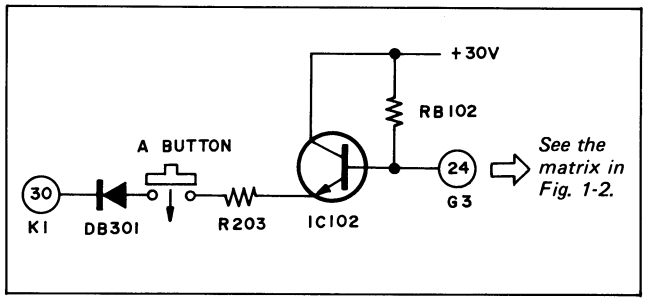
When the [1 MIN] button is pressed, the "H" signal is inputted to the (30) pin and the minute segment block is ready for accepting a minute setting.
The matrix when AM 1:23 is set by the above current time setting procedure is shown in Fig. 1-3.

		22p	23p	24p	25p	26p	27p
		G1	G2	G3	G4	G5	G6
13p	SEG-1		MON				
14p	SEG-2				a	a	
15p	SEG-3		b	upper colon	b	b	
16p	SEG-4		c	lower colon		c	
17p	SEG-5				d	d	
18p	SEG-6				e		
19p	SEG-7	AM					
20p	SEG-8				g	g	
		↑ AM	↑ 1	↑ :	↑ 2	↑ 3	

Fig. 1-3. Matrix in the case of setting AM 1:23

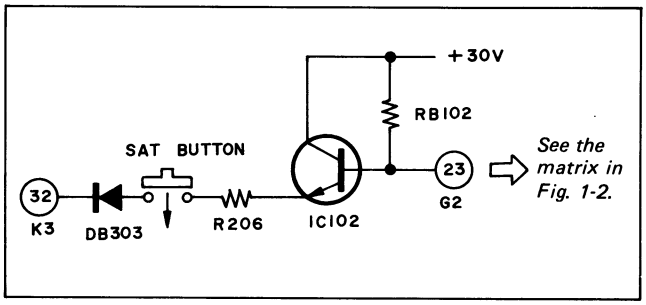
2. Program Time Setting

i) Press the [PROGRAM] button. (Example "1")

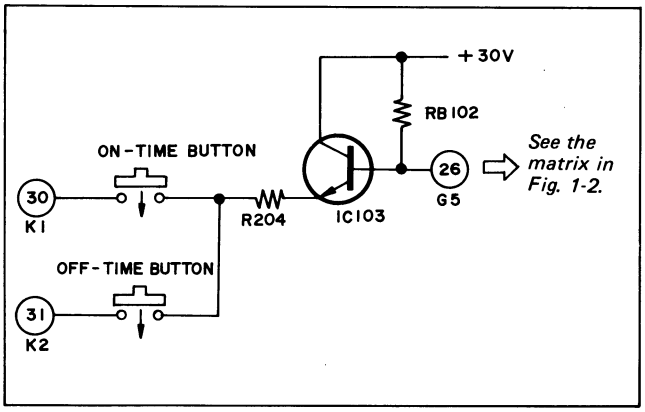


When the [A] button is depressed, the "H" signal is inputted to the (30) pin and the program setting mode ready for accepting the information is set up.

ii) Press [DAY] button. (Example: "SAT")



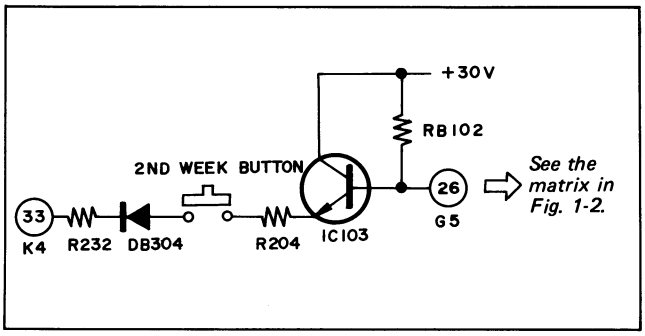
iii) [ON-TIME] and [OFF-TIME] buttons



When the [ON-TIME] or the [OFF-TIME] button is pressed, the "H" signal is inputted to the (30) pin or the (31) pin and the ON-TIME or the OFF-TIME mode is set up for accepting an HR, 10 MIN and 1 MIN information. When the [PROGRAM] button is pressed first, the ON-TIME mode is set up. Please refer to the matrix in Fig. 1-1, as to the LED displays of ON-TIME and OFF-TIME.

iv) **Press the [HR] , [10 MIN] , and [1 MIN] buttons.**
The circuit operations when these buttons are pressed are identical with the ones described in 1-iii), iv), and v).

v) **Press the [2ND WEEK] button.**



The matrix when PM 8:50 [2ND WEEK] is set by the above procedure (in the ON-TIME mode) is shown in Fig. 1-4.

		22p	23p	24p	25p	26p	27p
		G1	G2	G3	G4	G5	G6
13p	SEG-1						
14p	SEG-2		a		a	a	SAT
15p	SEG-3		b	upper colon		b	
16p	SEG-4		c	lower colon	c	c	2ND WEEK
17p	SEG-5		d		d	d	E_1
18p	SEG-6		e	ON-TIME		e	
19p	SEG-7		f		f	f	
20p	SEG-8	PM	g		g		

Fig. 1-4. Matrix in the case of PM 8:50 [2ND WEEK]

vi) **Designation of channel**
The 4 bit coded information of the designated channel is inputted to the (38) pin to (41) pin and memorized.

vii) **Designation of tape end**
The display when the [TAPE END] button is pressed in the OFF-TIME mode is —:— —. The matrix in this case is shown in Fig. 1-5. Refer to the matrix in Fig. 1-2, as to the relationship between the G outputs and the KEY inputs.

		22p	23p	24p	25p	26p	27p
		G1	G2	G3	G4	G5	G6
13p	SEG-1						
14p	SEG-2						
15p	SEG-3			upper colon			
16p	SEG-4			lower colon			
17p	SEG-5						E_1
18p	SEG-6						
19p	SEG-7			OFF-T			
20p	SEG-8		g		g	g	

Fig. 1-5. Matrix in the case of TAPE END —:— —

3. External Logic

Since the software of the micro computer cannot cover the functions fully, a hard logic construction is employed.

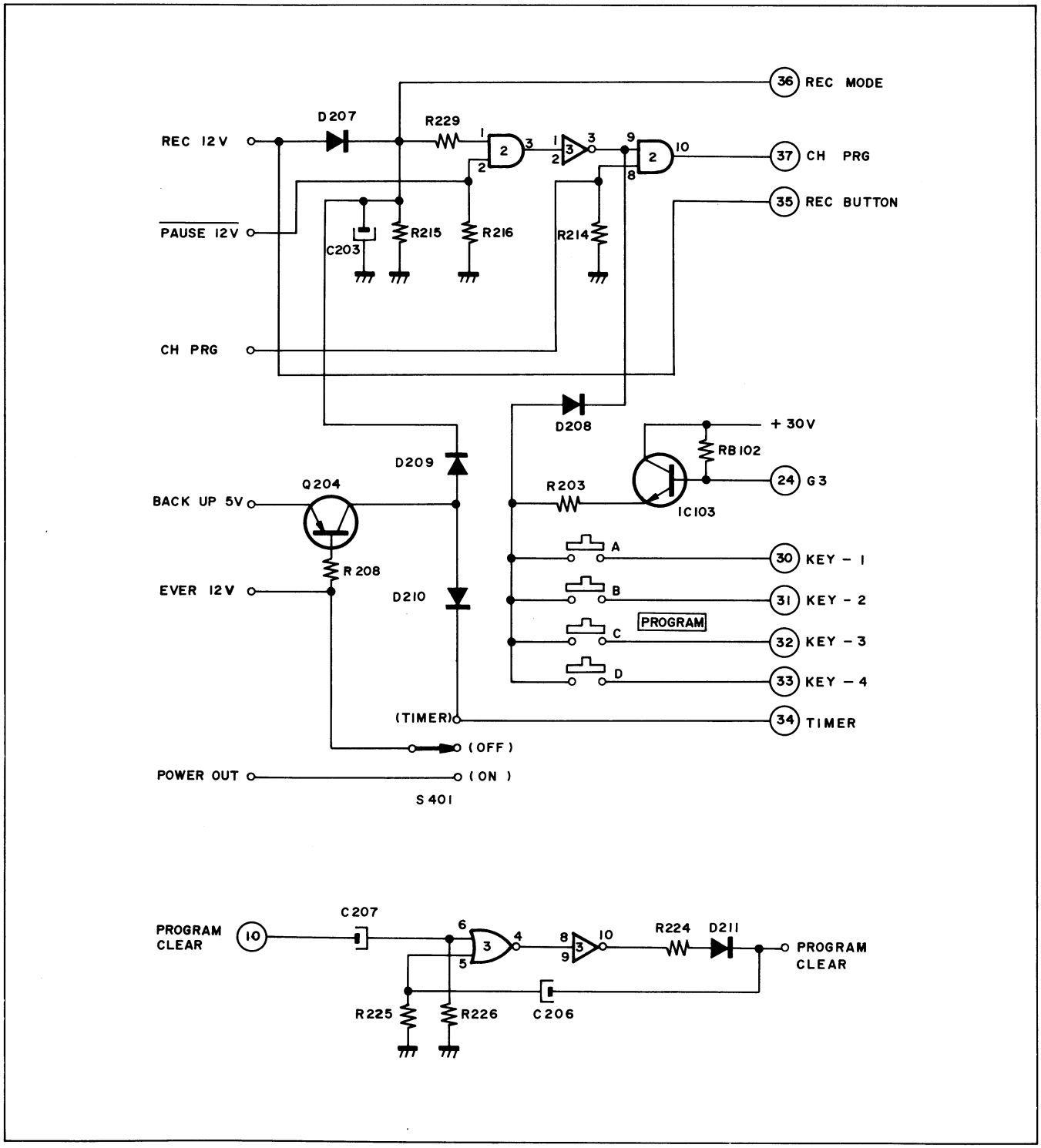


Fig. 1-6. External logic construction

Function of External Logic: (See Fig. 1-6.)

i) The TUNER CH selection in the EVER REC mode is possible only in the PAUSE ON mode.

ii) The PROGRAM CLEAR signal (from ⑩ pin) of the MICON OUT is converted to a drive pulse with a constant width

4. REFERENCE

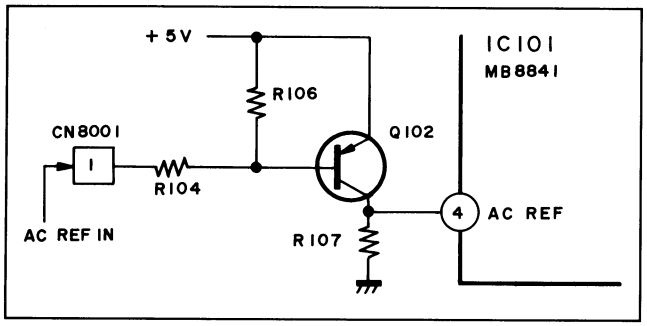


Fig. 1-7.

This timer is synchronizing to the power frequency. The input circuit of the AC REF signal to the micro computer is shown in Fig. 1-7. The AC REF signal inputted from the ① pin of CN8001 is fed through the wave shaper consisting of Q102 and R104, R106, R107 and inputted to the micro computer as a 60 Hz rectangular wave.

5. RESET

When the BACK-UP 5 V is lowered by discharge to approx. 4 V in the BATTERY BACK-UP mode during the power interruption, the micro computer is reset (MICON RESET), because the functions of the micro computer cannot be assured when the power supply to the micro computer lowers below 4 V.

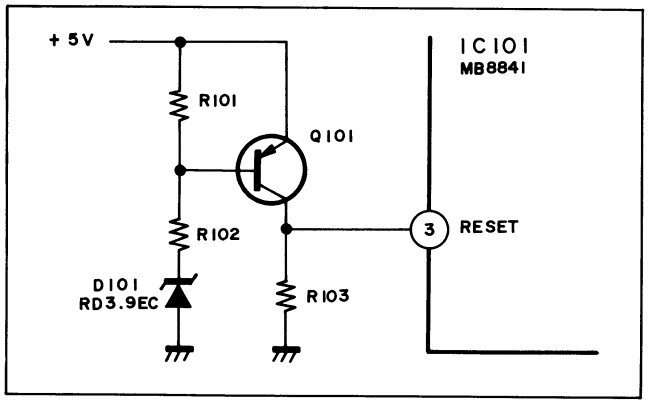


Fig. 1-8.

When the voltage of the +5 V line is larger than the threshold level (approx. 4 V), Q101 is on and the collector of Q101 is the "H" level. If the voltage drops below the threshold level, the voltage between the base and the emitter of Q101 becomes lower than 1 VBE (approx. 0.5 V), Q101 turns off, and the collector of Q101 turns to the "L" level, the micro computer being reset.

3. CIRCUIT DESCRIPTION ON TIMER

(1) Required Power Supply

- EVER 12 V .....for ICs
- +112 V .....for driving neon lamp
- +33 V.....for potentiometer
- REG 12 V .....

(2) Circuit Description

1. Block Diagram

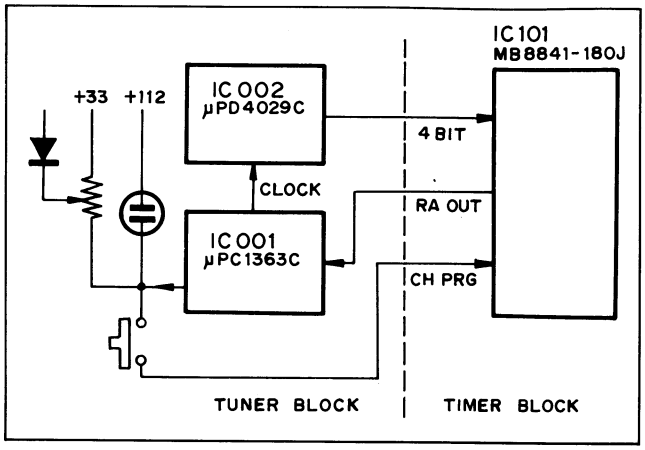


Fig. 1-9. Tuner/timer block diagram

A channel selection button was locked mechanically in the former machines. But the channel selection is locked electronically by using an integrated circuit (μPC1363C) in this machine, which realizes the feature of 2-week 4 events with the timer.

2. Manual Channel Selection

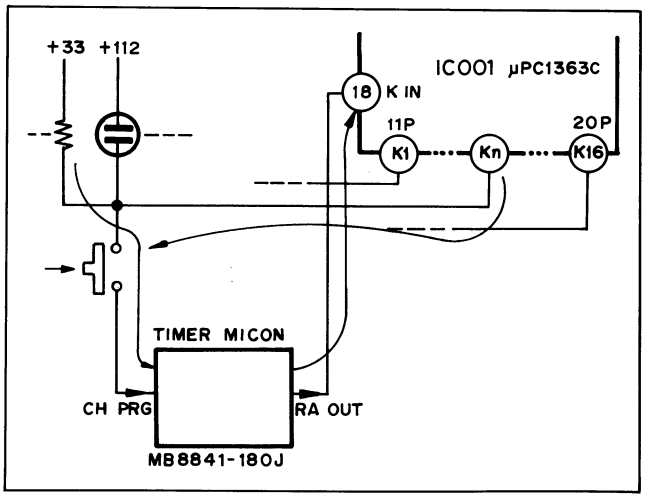


Fig. 1-10. Block diagram of manual channel selection

- When a channel selection switch is turned on, the "H" signal from the +33 V line is inputted to the TIMER MICON CH PRG terminal via the potentiometer and the switch and the "H" signal is outputted from the RA OUT terminal.
- When the "H" signal from the RA OUT terminal is inputted to the ⑱ pin of IC001 (μPC1363C), the channel selection starts. The inverter buffers turn on in the order of K1, K2, ... K16 and each pin becomes "L" (GND) in turn. This scanning continues during the ⑱ pin is "H".
- When the scanning reaches the channel whose switch has been turned on, the CH PRG signal turns to "L", the RA OUT turns to "L", the scanning stops, and the channel selection finishes.

3. Channel Selection by Timer

i) 4 bit binary coding of channel position

- Information on the channel position expressed by the ordinal position from K1 is coded to 4 bit binary for placing the channel position into the memory of the micro computer.
- The μPD4029C (with up down 4 bit binary counter preset enable) is used for the binary coding and the AFT DEFEAT PULSE from the ⑬ pin of the μPC1363C is inputted to the μPD4029C as the clock pulse. The initialize PRESET (finding ten K1 position) is expressed the sign 0000 by supplying the pulse from the ⑪ pin of the μPC1363C to the ① pin of the μPD4029C via the monostable multivibrator. Thus the channel position corresponds to the 4 bit binary code.

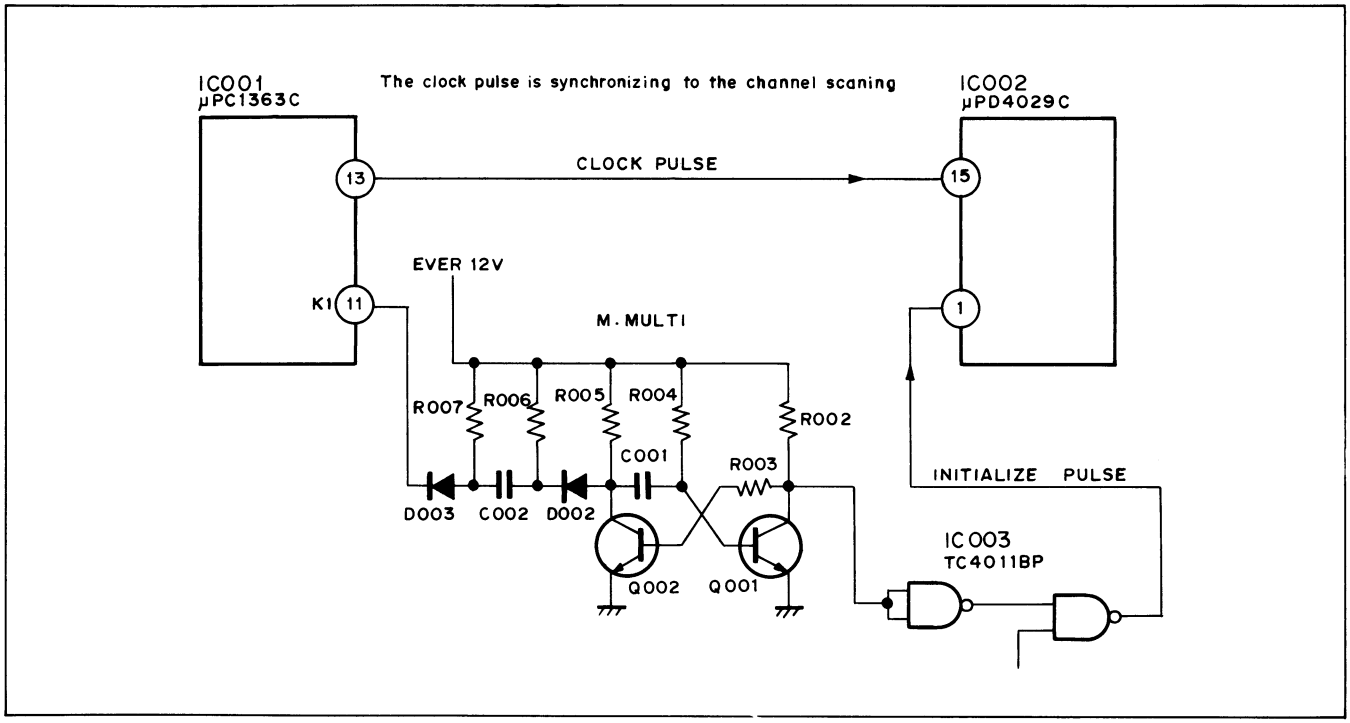


Fig. 1-11. Block diagram of channel position binary coding

ii) Operation in ON-TIME Mode

- The RA OUT turns to "H" when the TIMER PROGRAM ON TIME mode is set up and IC001 (μPC1363C) starts the channel selection scanning. The timer micro computer IC101 (MB8841) compares the memorized 4 bit binary code of the channel with a 4 bit binary code fed from the tuner whenever a channel is scanned. The RA OUT is kept at "H" until the code from the tuner coincides with the memorized one and then the RA OUT turns to "L". Thus the channel selection for the programmed channel is completed.

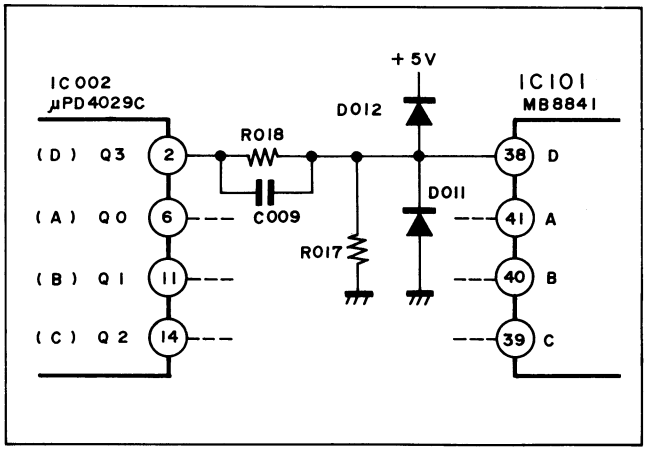


Fig. 1-12.

iii) Operation after Recovery of Power Interruption (in the BACK-UP circuit)

- The cases that the power interruption occurs are the following two:
  Power interruption and recovery during timer reservation
  Power interruption and recovery during record after ON TIME

  Since the ON TIME Operation after the recovery of the power interruption during the timer reservation is as described previously, the second case will be described here.

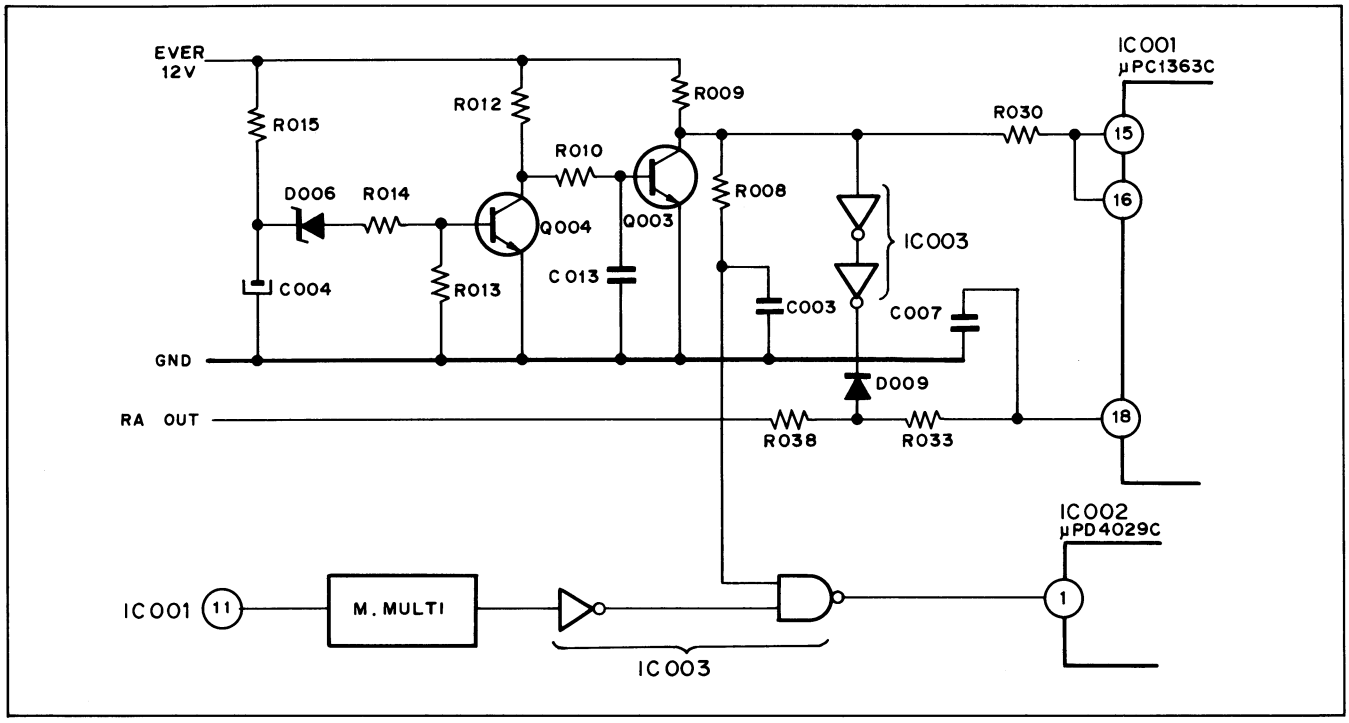


Fig. 1-13. Block diagram of operation after recovery of power interruption

- When the power interruption is recovered, the B+ rises. The initial channel setting circuit makes the ⑮ and ⑯ pins turn to "L" approx. 100 ms after the B+ rising. The RA OUT turns to "H" at the same time with the recovery and the initial channel setting circuit keeps the ⑱ pin at "L".
- The ⑮ , ⑯ and ⑱ pins turn to "H" after the initial channel setting time and the channel selection scanning begins.
- IC002 (µPD4029C) counts the rising of the clock pulse at the ⑬ pin of IC001 (µPC1363C) and the channel movement in the inside of IC001 is synchronizing with the falling of the clock pulse. If IC002 counts all the clock pulses, the 4 bit binary code becomes the code which advances one more than the actual code of the channel position. So the "H" is applied to the ① pin of IC002 during the first rising period of the clock pulse to set up the PRESET state.

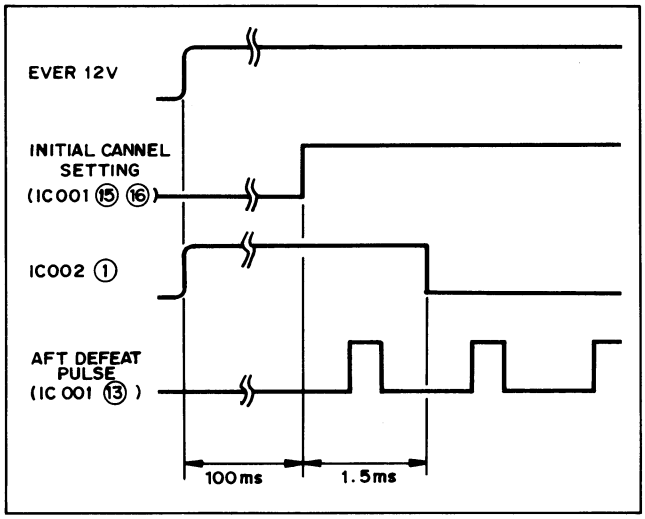


Fig. 1-14. Timing chart after recovery of power interruption

© 1980

SL-5600

SONY
SERVICE MANUAL

US and Canadian Model

January, 1983

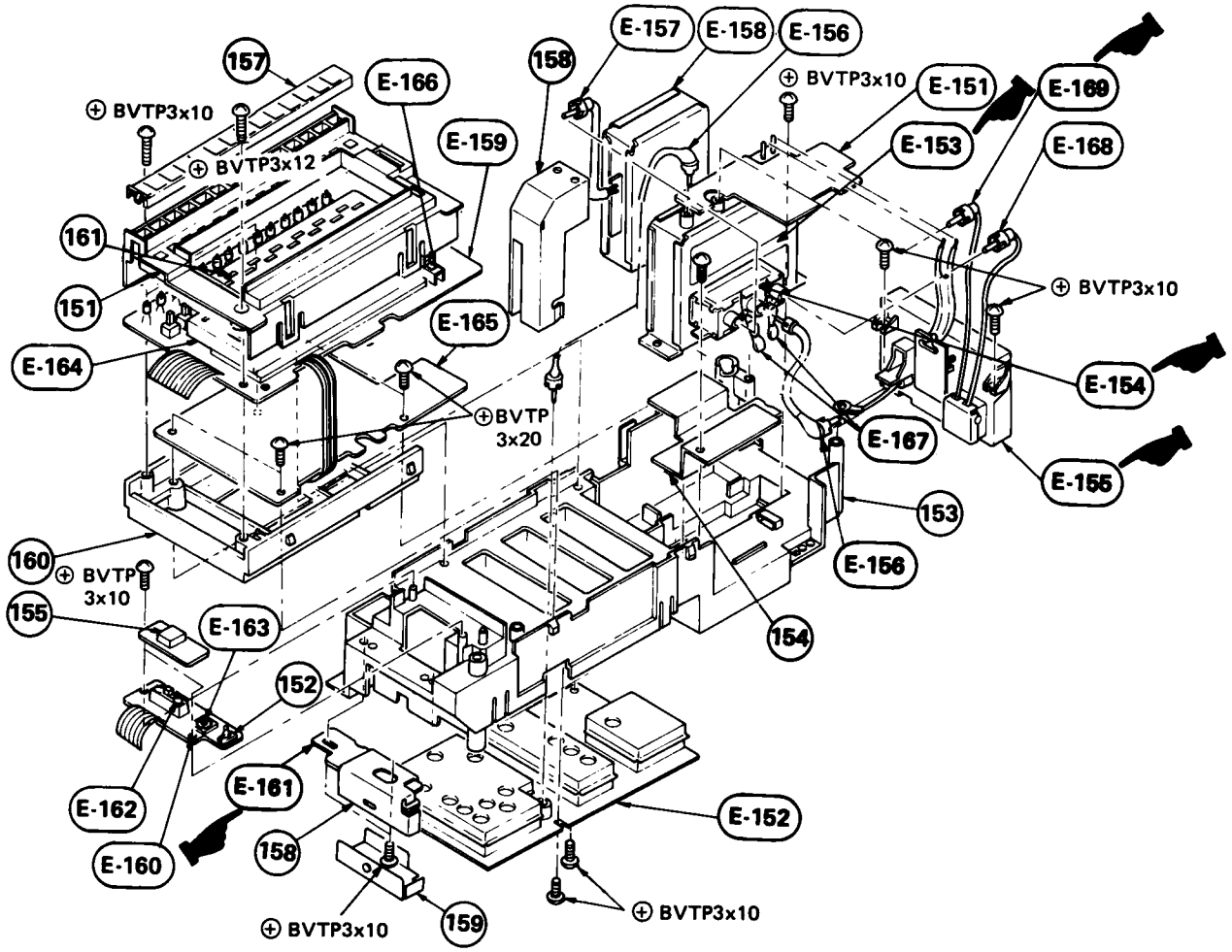
CORRECTION-1

Correct the service manual as shown below.

☛ : corrected portion

1. SECTION 4 EXPLODED VIEW

Page. 4-4. TUNER CHASSIS



2. SECTION 5 ELECTRICAL PARTS LIST

Page	Correct		Incorrect	
5-10	♦1-600-038-00 TR-2 BOARD ☛ E-161		♦1-600-038-00 TR-2 BOARD	
5-15	S9505 1-552-837-00 RF SELECTOR ☛ E-154		S9505 1-552-837-00 RF SELECTOR	E-158
	1-464-094-00 RF MODULATOR, RFU-534A ☛ E-158		1-464-094-00 RF MODULATOR, RFU-534A	E-154
	♦1-555-110-00 PIN CABLE ☛ E-169		♦1-555-110-00 PIN CABLE	
	♦1-555-112-00 PIN CABLE ☛ E-168		♦1-555-112-00 PIN CABLE	

MICROFILM

9-972-049-91

Consumer VIDEO

Sony Corporation
Consumer Products Group
Technical Support Dept.

English
83A0978-1
Printed in Japan

© 1983

SONY

Betamax

Service Bulletin No. 39

Model: SL-5600

Subject: Backup Battery

Date: July 11, 1980

SERVICE DIVISION • Technical Department

The SL-5600 has a battery for timer backup located on the TB-1 Board. The part number of the battery was inadvertently omitted from the SL-5600 Service Manual.

Please add the following information to the SL-5600 Service Manual.

Service Manual	Page	Ref. No.	Part Number	Description
Vol. 1 (1st edition)	83	B1	1-528-074-00	Battery (Nickel Cadmium)
Vol. 1 (final)	5-10	B1	1-528-074-00	Battery (Nickel Cadmium)

PRINTED IN U.S.A.

SONY

Betamax

Service Bulletin No. 40

Model: SL-5600

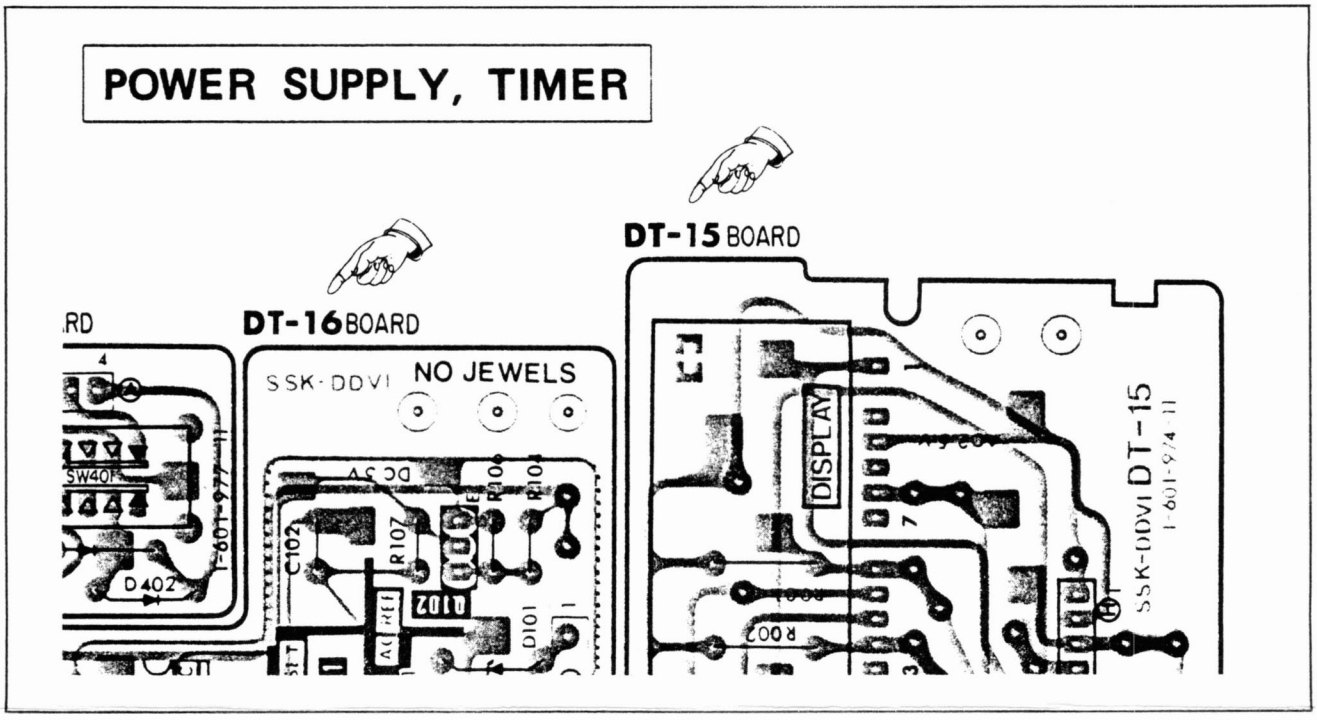
Subject: Timer PC Board Number Correction (DT-15 and DT-16)

Date: Augest 15, 1980

SERVICE DIVISION • Technical Department

Please make the correction indicated below to your SL-5600 Service Manual, Volume 1, page 3-40.

The timer PC board designations (DT-15, DT-16) given in the service manual are reversed.



PRINTED IN U.S.A.

SONY

Betamax

Service Bulletin No. 41

Model: SL-5600

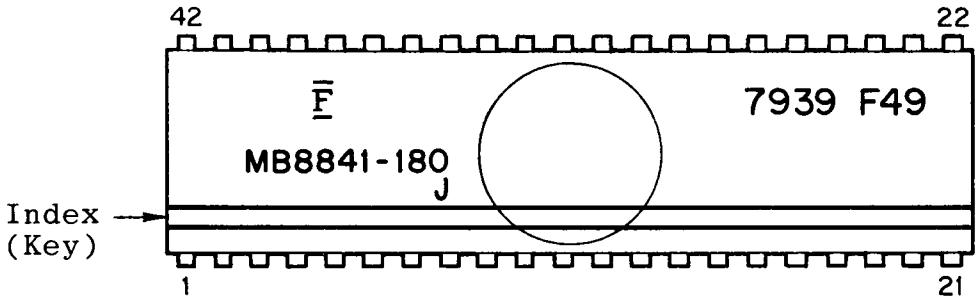
Subject: MB8841-180 (IC101, DT-16 Board) Index for Pin Number Identification

Date: Augest 15, 1980

SERVICE DIVISION • Technical Department

Please add the following information to your SL-5600 Service Manual, Volume 1, page 3-40.

Top view of IC101, DT-16 Board.



PRINTED IN U.S.A.

SONY

Betamax

Service Bulletin No. 43

Model: SL-5600

Subject: Tuner Chassis Exploded View

Date: November 14, 1980

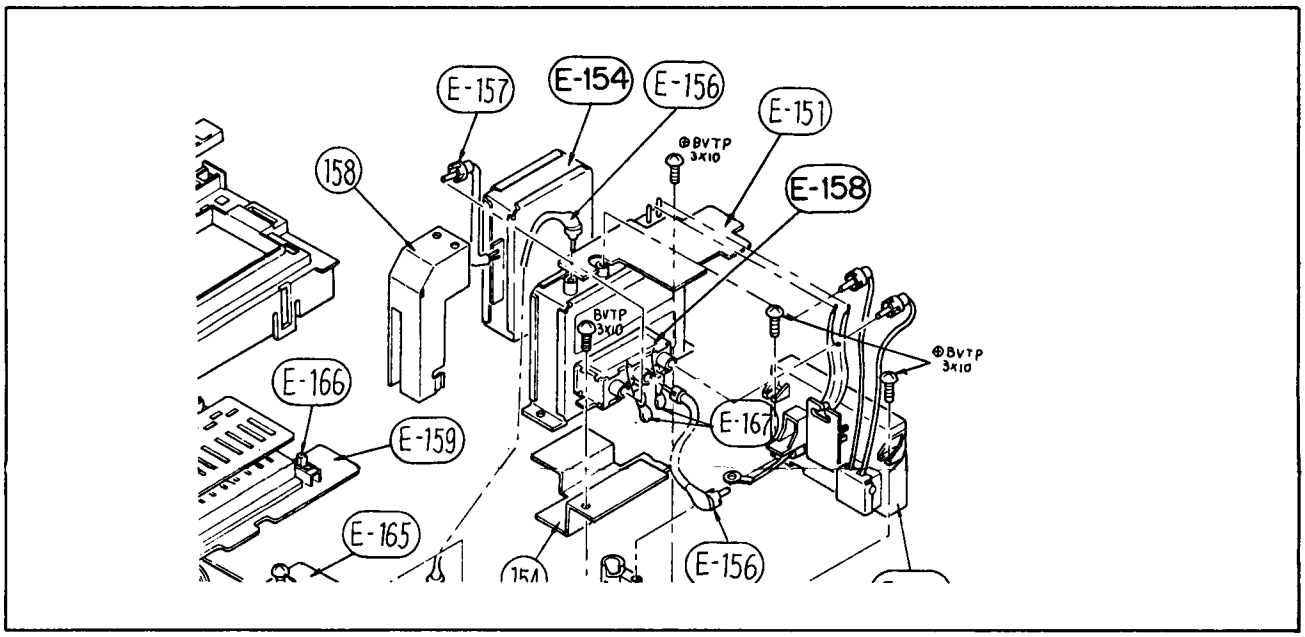
SERVICE DIVISION • Technical Department

The following corrections should be made to the SL-5600 Service Manual.

The RF modulator, which is labeled E-158, should be E-154. The RF selector, which is not labeled, should be labeled E-158. E-168 (pointing to the RF cables) should be deleted.

These corrections should be made in the service manuals listed below as indicated in the illustration.

SL-5600	Vol. I First Edition	page 62
SL-5600	Vol. I	page 4-4
SL-5600	US & Canadian Model	page 4-4



PRINTED IN U.S.A.

SONY Betamax

Service Bulletin No. 45

Model: SL-5600

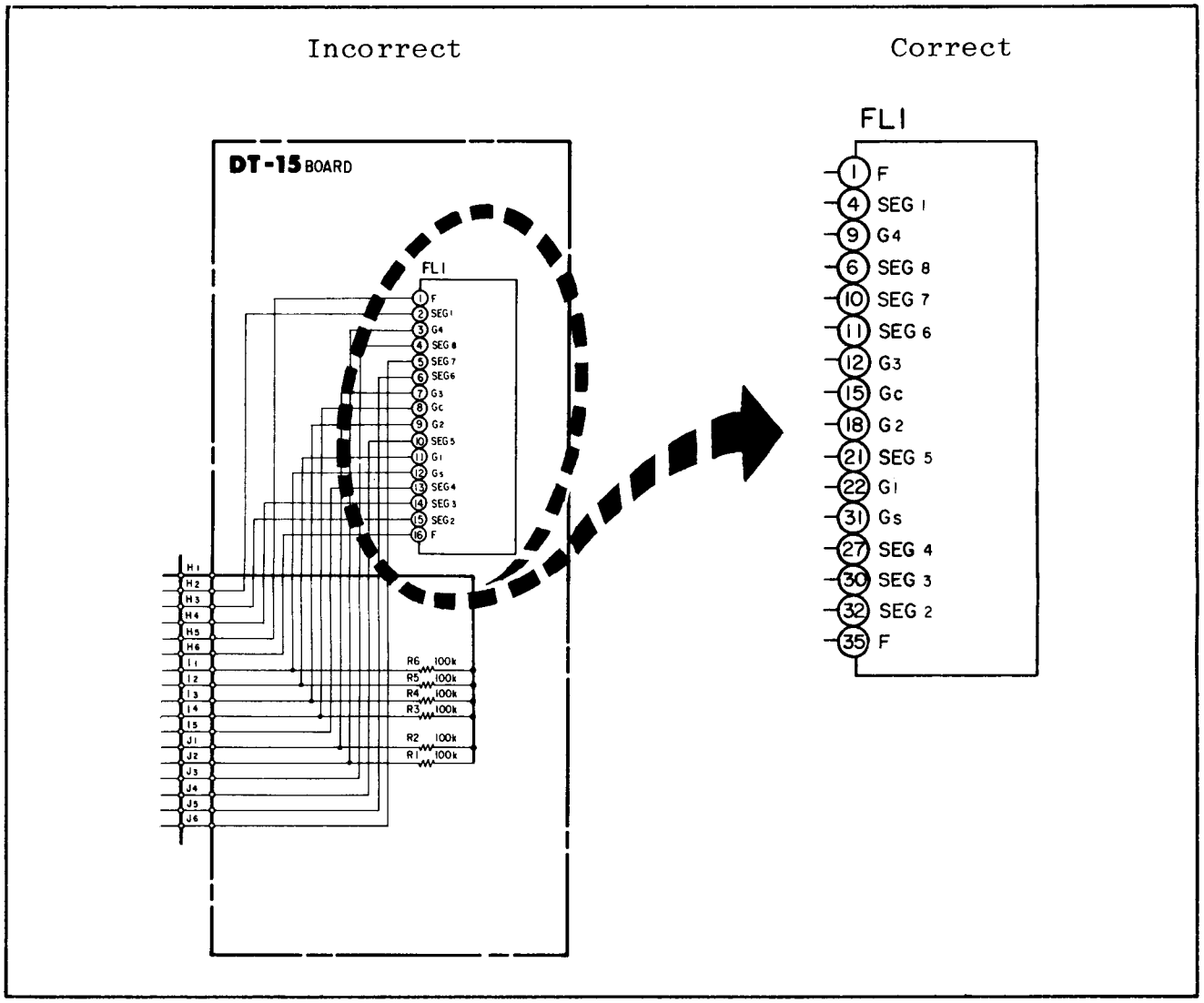
Subject: DT-15 Board Timer Display Pin Configuration, Service Manual Correction

Date: November 17, 1980

SERVICE DIVISION • Technical Department

In order to make the pin designations agree between the schematic and the board layout for FL001 on the DT-15 board, the following corrections should be made to the SL-5600 Volume 1 First Edition and SL-5600 Volume 1 Service Manual.

SL-5600 Volume 1 first edition	Page 35
SL-5600 Volume 1	Page 3-43



PRINTED IN U.S.A.

SONY

Betamax

Service Bulletin No. 53

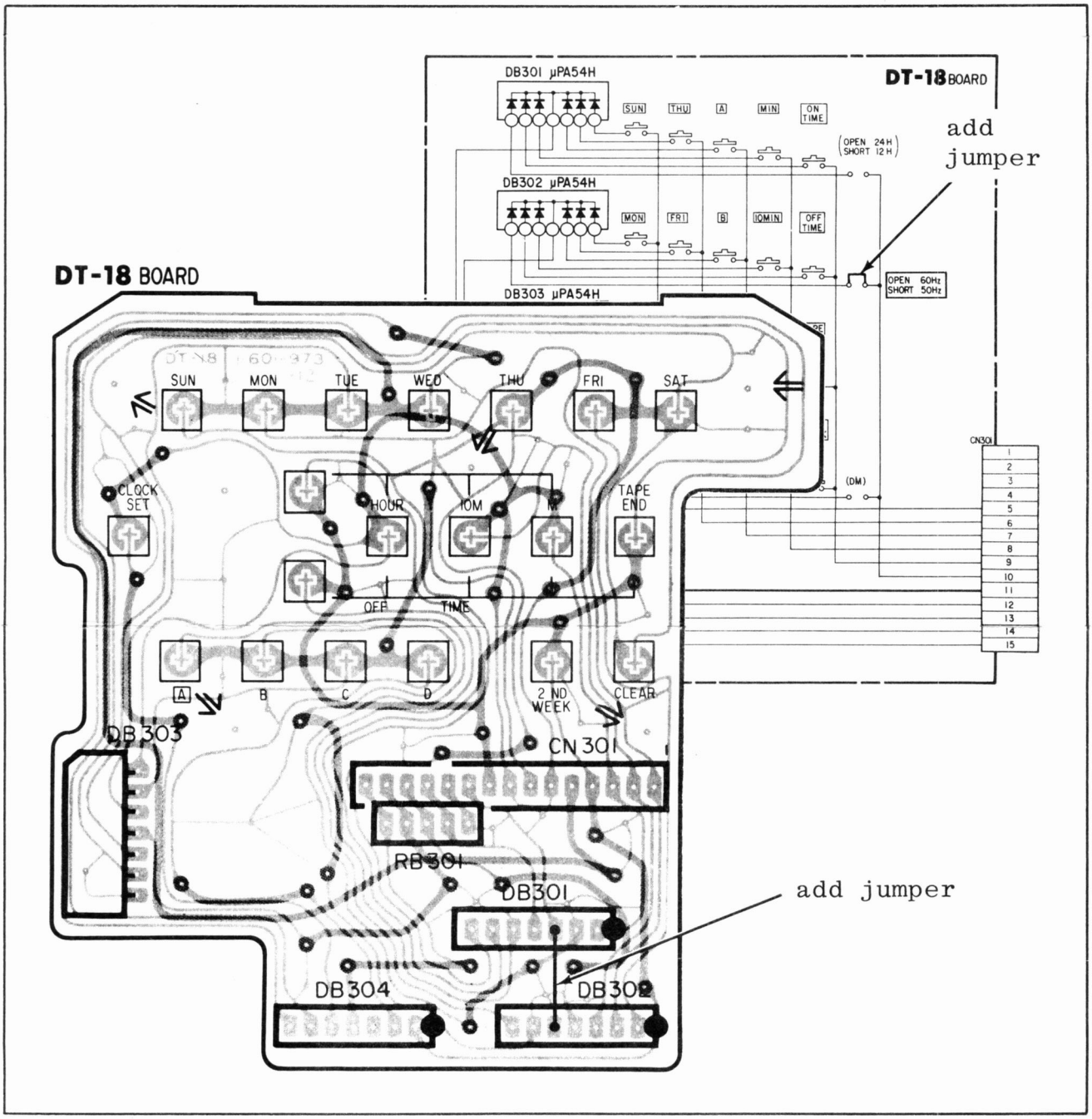
Model: SL-5600

Subject: 60 to 50 Cycle Timer Conversion

Date: March 9, 1981

SERVICE DIVISION • Technical Department

To convert an SL-5600 for 50 Hz operation, connect a jumper from pin 3 of DB301 to pin 5 of DB302 on the DT-18 Board as shown below.



PRINTED IN U.S.A.